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Editorial Notes

Coal Utilization Research

In April last we called attention in these columns to the formation of the British Coal Utilisation Research Association with a very substantial income assured for five years and supported by the coal trade and by a grant from the Government. We suggested at the time that this step might well be taken into account by the Gas Industry in any consideration as to whether its "official" research work is as effective as it could be made, whether its research—apart from that undertaken by individual gas undertakings and by the manufacturers of gas making plant and gas using equipment, on which hundreds of thousands of pounds are expended annually—is on too small a scale to command the attention which the activities of an industry of the magnitude of the Gas Industry should demand. We said how important it was that the Industry should take note of what the coal interests were doing.

Last week the B.C.U.R.A. held its first general meeting, and it is obvious enough from the Address of the President, Sir Evan Williams, that it has had a flying start and has organized itself on very sound lines indeed. It embraces all interests concerned in the utilization of coal; every colliery district and virtually every individual colliery company contributes to the funds of the Association, and after the colliery owners the coal-using appliance makers constitute the largest industrial contributing group. Though as yet no systematic approach has been made to coal consumers to give their support to the Association, certain concerns have already made large grants. Then there is a generous grant from the Department of Scientific and Industrial Research. In this regard Sir Evan Williams remarked that the B.C.U.R.A. is in receipt of the most favourable scale of grant which the Advisory Council of the Privy Council for Scientific and Industrial Research adopts for any of its Research Associations. The income of the Association for 1938 is £29,000—this is assured for five years, but it is only a beginning, and only two other Research Associations established under the D.S.I.R. have enjoyed in their first year an income approaching this figure. Steps are being taken to augment the income, and we have no doubt they will be successful. The Association has been established on a broad financial basis, and its organization has been planned co-operatively with drive and enthusiasm and, what is significant, with imagination. It will, we feel sure, have more than technical value to the coal interests. It will also have prestige and publicity value. It will appeal to the public and the politicians.

Premises for an experimental station—intended to be "the best equipped research station in the world to be devoted exclusively to research into the utilization of coal"—have been secured; £17,000 has been allocated for its equipment. The scientific staff of the Association numbers 30, of whom 17 are University graduates; and we would call the attention of the Gas Industry to the Association's method of recruiting junior staff. A grade of research students has been established. Boys are taken direct from school selected on the basis of their Matriculation or Intermediate Science Examinations and oral tests. Special facilities are given to these research students to continue their education with a view to a London University Degree. "This scheme," said Sir Evan Williams, "holds promise of providing not only the Association itself with young research officers with practical training, but of enabling it to pass on to the coal industry, to coal consumers, and to coal-using appliance makers trained workers in combustion research, the lack of whom is undoubtedly at the present time an obstacle to more rapid progress in coal utilization research." This, to our mind, shows vision. To what extent is the Gas Industry prepared to assist research students? And by this assistance we mean actual annual cash contributions.

There is another point of great importance to which we would refer. The B.C.U.R.A. has established a superannuation and pensions scheme for its staff, and this scheme has the full approval of the Department of Scientific and Industrial Research. What, we would ask in this regard, has the Gas Industry in mind for its own research workers? It is a pertinent question. One cannot expect of the majority of scientific research workers that they will sustain their output unimpaired with the passage of time, and the Industry in this regard has a responsibility. The Gas Industry, to our mind, has in the matter of research had an astonishingly good return for a very small expenditure—certainly as good as it was entitled to expect.

We point to the organization and the potentialities of the British Coal Utilisation Research Association—not in any

spirit of alarm, but to emphasize the need for the Gas Industry to put forward still further efforts to bring nearer the smokeless age. Perhaps the time will come when gas will supplant all solid fuel. We hope that this will in time be practical economics. But in gas and coke the Industry can offer an immediate economic solution to the problem of smoke. We have no doubt that the work of the B.C.U.R.A. will tend to retard the advent of the smokeless age, but that is not a reason for arriving at the conclusion that it will prevent it. We must carry on unceasingly with our own research and propaganda work; we must, in and out of season, show the public what the combination of gas and coke can do for them. The Gas Industry has the advantage of superior fuels; it has the advantage of superior equipment for using these fuels. It can and must, by modern selling methods, make effective its reply to the plans of those anxious to see an increase in the use of raw coal.

The Gas Referees

As already announced in the "JOURNAL," in accordance with the provisions of section 12 of the Gas Undertakings Act, 1934, the Office of Gas Referees will be abolished on Jan. 1 next, and, save where otherwise provided by the Act, the functions of the Referees will thereafter be discharged by the Board of Trade.

With the passing of the Office it may be of interest if we give some little account of the history, duties, and responsibilities of the Gas Referees, of which the man-in-the-street knows little or nothing about. In doing so we quote freely from a Paper read by Mr. W. J. A. Butterfield, one of the Referees, in 1932 and published in the "JOURNAL" for March 2 of that year. Gas Referees were first appointed under the provisions of Acts passed in 1868 and 1869 relating to gas companies then operating in London. The Referees continued to act in regard to the three Metropolitan Gas Companies until 1920, in which year the Gas Regulation Act extended their duties to all statutory gas undertakings in the United Kingdom. In 1922 their powers and duties in regard to Ireland ceased, owing to the changes brought about by the Government of Ireland Act. The early Gas Referees were concerned chiefly with photometry, and it was in this connexion that one of them—Dr. A. Vernon Harcourt—devised the 10-candle standard lamp from which the present International Standard of Light is descended. In 1905 they were called upon to prescribe methods of gas calorimetry, as supplementary and subsidiary to the official testings of illuminating power. The latter testings continued, though gradually fading in importance, until 1920, after which year calorimetry entirely displaced photometry in official testings of the quality of the gas supplied in Great Britain.

The duties of the Gas Referees were relatively light prior to 1921, because they were limited to the three Metropolitan Gas Companies, which, however, were responsible for more than one-fifth of the gas sold throughout Great Britain. The Referees have always been appointed by the Board of Trade, but at no time have they been Civil Servants, or precluded from other duties or pursuits; and the remuneration and expenses of the Gas Referees have at all times been recoverable from the gas undertakings which come under their prescriptions. It will be understood, then, that the Referees have been an independent body not subject to Parliament. They have been an independent body of eminent scientific men. We have mentioned Dr. Vernon Harcourt. We may also mention the names of Dr. J. S. Haldane and Sir Charles Boys, who was appointed in 1897 and has held office continuously since that year, and has, of course, been responsible for work of the utmost value and importance on gas calorimetry.

It is good to note that Sir Charles Boys and Mr. W. J. A. Butterfield, who has held the position of Gas Referee since 1917, have been appointed by the Board of Trade to act as Advisers as to the improvement of the methods and apparatus for testing gas. The Industry is fortunate in that the continuity of their work will not be broken and that it will still benefit from their long experience and wide knowledge of the needs of the Industry.

Gas *v.* Fuel Oil

WE referred in these columns last week to the decision of the Midland (Amalgamated) District Committee of Investigation in the appeal of the Stretford and District Gas Board regarding the price of coal fixed by the Midland Coal Selling organization. The decision was that "The Committee, having considered all the statements and evidence submitted to them, are of the opinion that the pithead prices about which complaint is made are not contrary to the public interest, not unfair or inequitable."

The Stretford and District Gas Board, as it well known, has shown great enterprise and courage in developing the use of gas for industrial purposes. In the year ended March, 1924, the industrial load of the undertaking was 166 million cu.ft. The figure for 1938 was 700 million cu.ft., in spite of the removal of the Ford Company from Trafford Park and with it the loss of a very large consumer. In evidence before the Committee Colonel W. M. Carr explained that most of that increase from 166 to 700 millions had taken place in the last five years. Of the total increase in the sale of industrial gas between 1935 and 1938 about 75% was in substitution for imported fuel oil. In 1935 the Board could buy coal at 15s. 4d. a ton. It could offer gas to industrialists at a price competitive with fuel oil. In the contracts made with the industrialists whose business the Board had gained the price of gas was subject to a coal clause.

In 1935, as we have said, the price of coal was 15s. 4d. In the contract for 1937-38, this price was raised by 6s. 6d. to 21s. 10d. It became necessary to increase the price of gas under the coal clause, which changed the competitive position of gas and fuel oil. Then came the straw which broke the camel's back—the demand by the Coal Selling organization of a further 1s. a ton. This at a time when the industrial consumers were saying that if the price of their gas was raised any more, the point had come when they must revert to fuel oil. Evidence was given before the Committee that if the price of coal was advanced the Board would not get new industrial consumers with whom they were negotiating and they would lose existing sales of gas. Negotiations, it was stated, were in hand with one firm which would take 50 million cu.ft. of gas per annum as a beginning, provided it could be reasonably sure that the price would be 3d. a therm. This firm is using fuel oil. Other negotiations represented about 140 million cu.ft. a year—all dependent on the price of gas, and therefore on the price at which the Board could purchase coal.

As we have mentioned, Stretford's industrial gas sales in the year ended March, 1924 were 166 million cu.ft., in the year ended March last 700 million cu.ft. The coal carbonized had risen from 50,000 tons a year to 100,000 tons, and of the increase about 41,000 tons represented additional coal

carbonized to supply gas to industrial consumers the majority of whom were formerly burning imported fuel oil. The Stretford and District Gas Board has created, in the form of gas, a new demand for 41,000 tons of coal a year to displace fuel oil. Presumably the Board is a good customer of the coal industry. It obviously cannot remain such a good consumer if it is to lose the industrial gas load which it has, after the expenditure of a very great deal of effort, won from imported fuel oil. The decision of the Committee of Investigation is a gift to imported fuel oil, and the business which the Board has worked so hard to obtain during the last twelve years stands in the balance.

A Family Association

ONCE a year for more than forty years past the Gas Companies' Protection Association have met to take stock of the position, and invariably the report which falls to be submitted on these occasions constitutes a record of useful work accomplished for the members. In no less a degree than hitherto was this the case with the report upon work done during the twelve months to September last which was adopted at the meeting held earlier in the present month. This report—presented to the members by the new Chairman of the Committee, Mr. F. G. Brewer, of the South Metropolitan Gas Company—has already appeared in the "JOURNAL," and readers will have gathered from it some idea of the scope of the Association's activities during the past year. But we have always realized that there exists another side to the Association's work which is perhaps of even greater importance than that which, as it were, "appears on the surface." Precisely what is meant by this "other side" was admirably portrayed by the Chairman when he referred to "what I may call our family Association."

Over the past year or so death has dealt heavily with the Association, who have lost stalwart supporters in Dr. Charles Carpenter, Mr. R. W. Edwards, Sir J. Ferguson Bell, and Mr. G. W. Anderson, all of whom were instrumental in shaping the course of affairs. Their loss has been, and must be, severely felt, but, with their example as a guide, there will be no flagging in the carrying on of the good work. The Committee have been fortunate in securing the services of Mr. Frank H. Jones as President of the Association in succession to Dr. Carpenter, and no less happy in their choice of Mr. Brewer to follow Mr. Edwards as Chairman. Something was said at the meeting regarding the labours of those whose decease is now deplored. They did indeed serve the members well, as did others who preceded them—including the late Mr. Henry E. Jones, whose name must inevitably be brought to mind by Mr. Frank Jones's election as President. With reference to "headquarters," of course, the name of Cooper still represents, as it has represented for so many years past, the "guide, philosopher, and friend" of the Association.

So far we have been dealing with the domestic side; there are also wider considerations involved. It is true that the object in the formation of the Association was the protection of gas companies, but the inescapable lesson of military experience is that attack forms the best method of defence, and certainly in industry progress is the surest form of protection. In fact, it may be said that "they serve best who progress most." As Mr. Brewer pointed out in his Address, there is everywhere evidence of growth of that sense of social responsibilities which is not content to leave conditions of life as they were, and in furtherance of the objects for which this spirit is at work the Gas Indsutry can be of great help. Since the war, it is said, at least £750,000,000 has been spent from public funds in providing better houses; while the total amount lent by the Building Societies in the same period exceeds £1,300,000,000. Indeed, according to the President of the Halifax Building Society, one family in every eight in Great Britain is buying a home through a building society, while there are numberless people who already own their houses.

Here, right at hand, are unrivalled opportunities for service of the most welcome kind—affording protection both to the consumers and to the gas companies. Just try to visualize for a moment something of the kind of service that protection of this character affords. We say "something," because, given the opportunity, there is practically no end to the service that gas can render in the home. Next note what Mr. Brewer had to say upon the subject: "The price at which gas can be supplied is an important consideration, and it is significant that in many parts of the country undertakings are now paying increasing attention to the institution of systems of charge which will help to place within the means of those for whom they are intended the benefits of a complete labour-free and smokeless fuel service." In very many cases to-day cost is of outstanding importance to Mr. and Mrs. Owner; it may be of even greater importance to-morrow. And remember the slogan—"Progress means Protection."

Gas Grids

The word "grid" has a peculiar fascination for the lay Press. In a London evening newspaper last week we learnt from an article on the front page that Britain's first gas grid is to be established in West Yorkshire—"part of a scheme to make British industry independent of imported fuel supplies by means of an underground network of pipelines for pumping coal gas under high pressure from key points to the gas undertakings which will distribute to the consuming factories." The grid referred to is, of course, that sponsored by the United Kingdom Gas Corporation. It is, however, hardly the first gas grid in Great Britain. In the early part of this year we commented in these columns on the outstanding success of the Sheffield Gas Company in operating the South Yorkshire Gas Grid, which scheme was sanctioned by Parliament in 1931. In 1937 sales of gas increased by 19%—following annual increases of 20% and 16%. The length of the grid main is now nearly 60 miles and 13 coke oven plants are connected to it.

Where Electricity was Superfluous

Especially coming at the time it did, last week's disaster at the Kingston Power Station was a staggering blow to the large portion of West Surrey that was affected by it. In one part of the stricken area the current was off for just over two days and two nights, and here, at any rate, the shopkeepers who had had the foresight to provide themselves with gas lighting were very few and far between, while even the railway station could not rise above a few oil lamps for the guidance of passengers, with the addition of a candle or two inside the booking office. Christmas shopping should have been at its height; the business portion of the old-world village—as it is still termed locally—should have been illuminated by coloured lights strung across the roadway; meat and other perishable foodstuffs should have been safely refrigerated—it is to be hoped that at least in some instances this was the case. But, no doubt, even so depressing a state of affairs as this presented quite a number of humorous aspects. Early closing day mitigated inconvenience on the evening of the catastrophe, but it did not interfere with the appearance in the street of a man having a barrow-load of candles to sell. Then there is the reported reply of Counsel who was presenting his case at the moment when the electric light failed, and was offered by the Magistrates the opportunity of completing his remarks on the fol-

lowing morning. He is said to have acknowledged the offer with the remark: "My case is so clear that it can be seen just as well in the dark as in the light." A further bright spot was that, in the effort to put matters right, the Wandsworh and District Gas Company were stated to have lent men and lorries from their Kingston Works, which are near to the Power Station.

Valedictory

With this week's issue we bid adieu to the sectionalized front cover layout whose "small ads." have been a characteristic of the "JOURNAL" since No. 4 appeared in the year 1849. The change has been broken gently to our readers, for since the beginning of this year we have alternated the old form with the new displayed advertisement which, it is generally agreed, enhances the appearance of the "JOURNAL." Doubtless some will ask: "Why alter a feature by which the 'JOURNAL' has been recognized for well over half a century?" To them we would, with all deference, reply: "Would you, while sober and in your right mind, appear before your friends dressed in the same style of clothing you wore fifty, forty, thirty, even twenty years ago?"

But we really need offer no excuse to those who always regret the passing of what they are pleased to call "the old traditions." We are confident that, in making this change absolute and conforming in our new "jacket" to the best tenets of modern technical journalism, we are serving the best interests of the Industry. In fact, our Industry which claims to be as modern as the hour can demand almost as a right that its weekly record be dressed in modern garb.

As a matter of interest we have turned to some of the early numbers of the "JOURNAL" to try to discover which of the firms lately occupying positions on our front cover could claim to have been there the longest. As a result, we found that Wm. Parkinson on the front cover of the issue of March 11, 1850, "begged respectfully to announce that he had, in addition to the continued manufacture of gas meters, commenced (under Patent) the manufacture of meters for measuring water, spirits, &c." Another firm well-known to-day which was early in this field was George Glover & Co., who regularly occupied a position on the front cover only a few years later. The first library volume of the "JOURNAL" to be bound with the tinted cover which has extended in slightly differing shades down to the present time was Vol. 77, and on this we find the claim of the Gas Purification and Chemical Company, Ltd., that "O'Neill's Oxide has the largest annual sale of any oxide in the world." Their name will appear again in the same position on the last such cover. These are but examples, taken almost at random, of friends whose "small ads." have characterized the front cover of the "JOURNAL" since the earliest times.

Not without some feelings of regret, we put our chessboard front cover "to bed" for the last time, and say good-bye to the chessmen as such. If they, too, regret the disappearance of the familiar squares, they will realize also that a form of publicity which is *démodé* must pass and that, by giving their advertising a modern twist, they will really better serve their own ends as well as those of the Gas Industry.

The "GAS SALESMAN"

The December number which reached subscribers at the end of last week is again on the modernized lines which have characterized recent issues, and which have been so enthusiastically received on all sides of the Industry. Notes on Modern Gas Fitting, A Woman's Viewpoint, and Columbus Junior's usual breezy review from the American angle hold their customary places; a specially contributed Introduction to Sales Management is of particular interest to the medium-sized and smaller undertakings; the new factory lighting standards are summarized and discussed from the business-getting point of view. Between these main features the gaps are filled with a variety of items of help and inspiration to gas salesmen, and the usual large section is devoted to the transactions of the B.C.G.A. Circles. It is, in fact, an issue covering a wide scope of activities, backed by advertising pages which alone will well repay study for the information which they contain.

Letter to the Editor

Does Benzole Recovery Pay?

SIR,—Your article under this heading is very timely. Although you give figures for continuous vertical retorts only, and limit your calculations to one price of coal, similar tables can easily be constructed for horizontals and blue water gas or any other installation, and for any price of coal. It is to be hoped that the article will, therefore, stimulate interest in the subject.

We are urged on all sides to prepare for any National emergency which may arise, and I suggest that one of the most vital needs in such an emergency would be the maximum output of benzole.

During the European War the great need was first for toluole, and later for benzole—both, of course, for high explosives—and the Gas Industry played an important part in supplying these needs. In those days however, although the recovery of crude benzole was a less profitable business than it is at present, the difficulty was not to find gas engineers who were willing to strip their gas, but to procure the plant necessary for them to do so. With benzole recovery showing an attractive profit, it is unthinkable that we should risk a repetition of that position.

It is sometimes objected that benzole derived from certain carbonizing processes is unsuitable for nitration by reason of its high paraffin content, but, if we ever have to face the tragedy of another war, motor spirit will be almost as essential as explosives, and benzole of all grades will be a vital necessity.

I submit, therefore, that it is the clear duty of every gas undertaking to consider this matter most seriously, and, unless there are abnormal circumstances, to erect plant for the recovery of the maximum quantity of crude benzole in time of emergency. If, as we all fervently hope, that emergency does not arise, the rate of recovery can be adjusted to suit the circumstances of the undertaking and the balance-sheet of the process. The latter will (as indicated in your article) be favourable even at partial load.

Yours, &c.,
S. E. WHITEHEAD.

Gas Offices,
Southampton,
Dec. 16, 1938.

Forthcoming Engagements

1939.

January

7.—London and Southern Juniors.—Visit to Wandsworth Gas-Works.
7.—Scottish Eastern Juniors.—Short Paper Meeting at Dunfermline.
12.—Midland Juniors.—Lecture by A. T. Green, F.I.C., of the British Refractory Research Association.
14.—Scottish Western Juniors.—Visit to Maxol Heaters, Ltd., Manchester.
14.—Yorkshire Juniors.—Paper by H. A. Fells, of Sheffield.
16.—W.G.C.—Training Committee, 11 a.m.; Executive Committee, 2.30 p.m.; Summer School Committee, 4.30 p.m.; London and Home Counties Demonstrators' Circle, 7 p.m.
17.—London and Southern Juniors.—Meeting at Kennington. Paper by G. S. J. Knott on "Meters and Standards."
19.—L.C.C.A.—At Gas Industry House. Finance Committee, 10.45 a.m.; Executive Committee, 11.15 a.m.; Central Committee, 2.30 p.m.
21.—Wales and Monmouthshire Juniors.—Meeting at Newport.
21.—Western Juniors.—Visit to Cheltenham. Paper by Leopold Friedman, of Ascot Gas Water Heaters, Ltd.
28.—Scottish Western Juniors.—Visit to Parkinson & Cowan, Ltd., Glasgow.

February.

1.—London and Southern Juniors.—Visit to Cricklewood Works of British Oxygen Company.
1.—Manchester and District Juniors.—Visit to Staveley Coal and Iron Company, Ltd., Chesterfield.
2.—Midland Juniors.—Paper by F. A. Reynolds, "Some of the Uses for Gas at Wolverhampton."
4.—Scottish Eastern Juniors.—Visit to Messrs. William Dixon's Coke Oven Plant, Govan Ironworks.
11.—Scottish Western Juniors.—Paper by D. Beavis, of Helensburgh, on "The Modern Domestic Field."
14.—London and Southern Juniors.—Paper by A. Ronca on the 1937 Factory Act (at the H.O. Industrial Museum).
17.—B.C.G.A.—Gas Industry House. Executive Committee, 11.30 a.m.; General Committee, 2.30 p.m.
18.—Scottish Western Juniors.—Annual Whist Drive and Dance.
23.—Joint Junior Visit to B.I.F.

Personal

Mr. HENRY CAMM, who was Manager of Thermal Appliances, Ltd., until their absorption by Radiation Ltd., advises us that he has now joined a large concern specializing in gas water heaters.

Obituary

A very large number of friends of the late OCTAVIUS THOMAS, to whose passing we referred last week, were present at his funeral last Wednesday. The chief mourners were the Reverend and Mrs. Thomas Jones (son-in-law and daughter), Mr. Donald L. Thomas (son), and other relatives. The National Gas Council was represented by Sir David Milne-Watson, D.L., LL.D., and Mr. W. J. Smith, The Institution of Gas Engineers by Mr. H. D. Madden, the Wales and Monmouthshire Association of Gas Engineers and Managers by Mr. J. H. Canning, O.B.E., J.P., the British Road Tar Association by Sir Charles H. Bird, J.P., the South Wales Tar Distillers by Mr. Reginald R. Bird, the Cardiff Gas Light and Coke Company by Messrs. R. H. Williams, James Miles, J.P., H. D. Madden, Trevor Morgan W. Jones, A. R. Taverner, F. Boardman, R. H. Bone, W. R. Branson, and B. J. Bell. Others present were: Messrs. B. Grainger, R. L. Aspinall, H. Sutcliffe, J. F. Rust, C. B. Felton, W. H. Johns, E. Ablett, W. T. Kensole, A. W. Davies, R. J. Rogers, J. Sadler, S. Jones, W. D. Walters, D. W. Davies, and R. S. Shadbolt.

Octavius Thomas—An Appreciation.

The death of Octavius Thomas removes from our midst a well-respected—one might almost say revered—and beloved friend. He was associated with my very earliest memories of childhood and through the course of my life has made his influence felt with wise counsel and prudent advice. In any difficulty it was to Octavius Thomas that I automatically turned, confident in the knowledge that I should have a patient hearing and that all aspects of my problem would be logically considered. His advice when tendered might, or might not, be palatable, but it was—as always—unerringly sound.

He was truly the friend of the young man in the Industry. This interest was generally unknown, except to very few, because Octavius Thomas was by nature retiring. There were occasions, however, when his concern for the welfare of the younger generation brought him more into the public eye. This was particularly evident in the formation of the Wales and Monmouthshire Junior Gas Association, which owes its existence to-day to his energy and foresight and which supplied a long-needed outlet for the juniors in that district. When he had seen the Association successfully launched on its career he was always ready to help it over its "teething troubles" with fatherly advice and assistance coupled with his unobtrusive support at many a meeting. He displayed a live interest which had an incalculable effect upon the future success of the Association.

He would refuse advice to no-one. Assistance he always gave freely but with one stipulation. The applicant had to merit his help. He would never give a testimonial to anyone unless he knew him thoroughly and, as a result of that knowledge, could give him his conscientious unqualified support.

To the many young men of the Industry, whom he has helped generously and unstintingly from time to time, he was more than a friend. His interest was, indeed, almost paternal. No poor words of mine can possibly do more than scant justice to one whom I shall miss more than I care to admit even to myself. Loyal; sincere; conscientious to a degree; great-hearted; unselfish; honest in the truest sense of the word; generous and retiring—these were some of his many attributes which endeared him not only to his own generation, but to all who had that great privilege of his friendship.

PAST-PRESIDENT,
Wales and Monmouthshire Junior Gas Association.

Inventors and Patentees' Diary

Feeling that a diary embodying information on patents would appeal to inventors and patentees, Kings Patent Agency, Ltd., of 146a, Queen Victoria Street, London, E.C.4 (whose founder, Mr. Benjamin T. King, commenced to practise in 1886) last year published the first edition of their "Inventors and Patentees" Diary.

The notes in the new edition, which have been revised to incorporate amendments made in the Patents Laws during 1938, include references to the nature of patents, who may apply, the manner of application, opposition to the granting of a patent, sealing the patent, renewal fees, sales and licencing, searches, foreign patents, &c., in addition to postal and other useful information. As the demand for the first edition was even greater than expected the price this year is being reduced to 1s. 6d. post free.

British Commercial Gas Association

Annual Conference

We learn that the President of the British Commercial Gas Association, Mr. A. M. Paddon, has renewed the invitation to the Association to hold the next Annual Conference at Brighton in place of the one postponed owing to the International Crisis. It will be recalled that the invitation was extended on his election for a further term of office at the General Meeting in London on Oct. 18 last.

Hitherto the Association's Conferences have been held in the month of October, but it is felt that on the forthcoming occasion it would be advantageous to arrange the meeting earlier in the year. In that connexion, therefore, the Executive Committee, in consultation with the President, have decided that the Conference shall take place from and including April 22-25 next.

As in the case of the postponed Conference, the Association is arranging to have distinguished speakers at the various functions and business meetings. The social events will also follow a similar programme.

Those who intend to attend the Conference are advised to make their hotel reservations at an early date.

Institution of Gas Engineers

Members of The Institution of Gas Engineers will be welcome at the 29th Annual Exhibition of Scientific Instruments and Apparatus of the Physical Society on Tuesday, Jan. 3, 1939, at 2.30-9 p.m., Wednesday, Jan. 4, at 4-9 p.m., and Thursday, Jan. 5, at 2.30-9 p.m. It will be held at the Imperial College of Science and Technology, Imperial Institute Road, South Kensington, S.W.7.

Discourses will be held in the large Physics Theatre at 7.45 p.m. on Tuesday, Jan. 3, and Wednesday, Jan. 4, 1939, at which the following Papers will be read:

Tuesday, Jan. 3, 1939.—"The Cyclotron and Its Applications," by Dr. J. D. Cockcroft, M.A., M.Sc., M.Inst.P., F.R.S.

Wednesday, Jan. 4, 1939.—"Geophysical Research in Polar Regions," by Mr. C. F. Wright, C.B., O.B.E., M.A.

Admission to the discourses is by special ticket, only issued at 7 p.m. each evening at the Exhibition.

Admission tickets for the Exhibition can be obtained from the Secretary of the Institution of Gas Engineers.

Amalgamation and Grouping

United Kingdom and Marple.

The Marple Urban District Council has decided to approve the recommendation of the General Purposes Committee authorizing the Gas and Electricity Committee to proceed with provisional negotiations with the United Kingdom Gas Corporation for the sale of the Council's Gas Undertaking.

Coatbridge and Airdrie.

A plebiscite of Airdrie ratepayers is to be taken to decide the future of Airdrie's gas supply, according to a decision reached at a special meeting of Airdrie Town Council on Dec. 15, held to decide whether the Airdrie Gas-Works should be sold to the Coatbridge Gas Company or retained as a municipal undertaking and reconstructed. The question of the gas undertaking has been under consideration for more than a year, and a previous decision to refuse the Coatbridge Gas Company's offer and to reconstruct the plant was rescinded some months ago. An amendment by Provost Gray that a plebiscite of the ratepayers be taken defeated a motion supported by the Socialist members for the rejection of the Coatbridge Gas Company's offer. The question of the plebiscite was then put to the vote against the recommendation for the sale to Coatbridge made by the special subcommittee and the Gas Committee and the plebiscite was carried.

The offer of the Coatbridge Gas Company, it will be recalled, is to take over the Airdrie Undertaking, paying off the outstanding loan debt, which is in the region of £20,000, and supplying gas at Coatbridge rates. The Coatbridge rates are at present 8·4d. per therm, against 1s. 0½d. per therm at Airdrie. The cost of the reconstruction of the Airdrie plant would be in the region of £30,000. The plebiscite will be held early in the New Year.

News of the Week

The Calorific Value of the gas supplied by the Scarborough Gas Company is to be increased from 450 to 500 B.Th.U. per cu.ft. on March 20, 1939.

The County Borough of Halifax invite applications for the position of Gas Engineer and Manager, at a salary of £1,100 per annum. Further particulars are given in our advertisement columns.

Applications Are Invited for the post of Engineer and Manager to the Carlisle Gas Undertaking, at a commencing salary of £900 per annum. Further details will be found in our advertisement columns.

One of the Objects of a Special Order, for which the Horsham Gas Company intend to apply to the Board of Trade under the Gas Undertakings Acts, 1920 to 1934, is to increase the authorized capital of the Company.

For the Public Lighting of Blaby (Leics.), the Parish Council have decided to renew their contract for a further seven years with the Narborough Gas Undertaking, which Company will shortly be taken over by the Leicester Corporation.

Application for a Special Order, under the Gas Undertakings Acts, 1920 to 1934, is intended to be made to the Board of Trade by the Cambridge University and Town Gaslight Company with the object *inter alia* of extending the limits within which the Company are authorized to sell gas.

Among Exhibitors at the Liverpool Livestock Show, held at Stanley cattle market on Dec. 14, was the Liverpool Gas Company. In the group of trade stands, that of the Company was outstanding by reason of the attractive range of dairy utensils, which included milk boilers, testers, sterilizers, &c.

A Series of Successful Cookery Demonstrations was recently held by the Padiham U.D.C. Gas Department in collaboration with the Parkinson Stove Company at Sabden and Read. The cookery lectures on interesting menus were given by Miss G. Hiscox, M.C.A., and the interest shown was reflected in an excellent sale of cookers.

An Attractive Christmas Window was arranged by the Spenborough Gas Department at their central showrooms at Cleckheaton. The window was arranged as Alladin's Cave, with "Mr. Therm" as the Genii of the Lamp and "Gas for Ease and Comfort" as the password for opening the decorated cave, leading to a specially attractive array of domestic gas appliances in the showrooms proper.

New Carbonizing Plant at Heckington Gas-Works was inaugurated by the Chairman of the Parish Council, Mr. J. W. Stevenson, on Dec. 8. Afterwards a luncheon was held at the Nag's Head Hotel, at which Sir Harold Middlebrook, Chairman of the Heckington Gas Company, presided. The toast of "The Heckington and Great Hale Parish Councils" was proposed by Mr. W. R. Gill, a Director of the Company.

Gas is to Replace Electricity at Rearsby (Leics.), where the inhabitants have decided to change the medium for their street lighting. A representative of the Leicester Corporation Gas Department explained at a public meeting in Rearsby Village Hall that it would be possible to replace the present six electric lamps of 100 candle power by ten gas lamps of 250 candle power without increasing the cost to the village. The Department proposed to make Rearsby the subject of an experiment in modern gas lighting. The meeting unanimously accepted the offer for a period of seven years.

Cookery Demonstrations recently held in the Albert Hall, Barnoldswick, were an unqualified success. The total attendance of 1,250 constituted a record for the town. Also the immediate business resulting is claimed as another record. The demonstrations which were arranged in conjunction with the Barnoldswick U.D.C. Gas Department and Radiation Ltd. included a special attraction of chocolate cooking by Cadbury Bros. Cake-baking competitions arranged for adults and children proved popular and successful. The untiring efforts of Mr. H. Spencer, Engineer and Manager, with the support of his staff, were well repaid.

Showrooms at South Shields

Greater use of gas as the remedy for the Borough's smoke problem, which has been suggested as the reason why South Shields could not aspire to be a health resort, was suggested at the opening of the new showrooms of the Newcastle-upon-Tyne and Gateshead Gas Company at South Shields.

Mr. W. A. Armstrong, a Director, who presided, referred to this point and said that if the people would only burn coke instead of coal they would not only benefit themselves but also their neighbours. "To burn crude coal in an open grate is an unsocial act," he added. Sales of gas in South Shields were increasing, he said, as were also the sale of appliances.

Lady Readhead performed the opening ceremony and congratulated the Company on its enterprise. "My experience with gas in South Shields has been wonderful," she said, "and I want to say how lucky we are to be able to come to this showroom and see all the gadgets of the Gas Industry. Whether we live in a small or a large house we are out to save labour and in gas you have something clean, efficient, and economical." Having declared the showrooms open, Lady Readhead was presented with a silver bowl by Mr. T. A. Page, of Messrs. T. A. Page, Son, and Bradbury, South Shields, Architects, for the showroom.

Soil Corrosion and Pipeline Protection

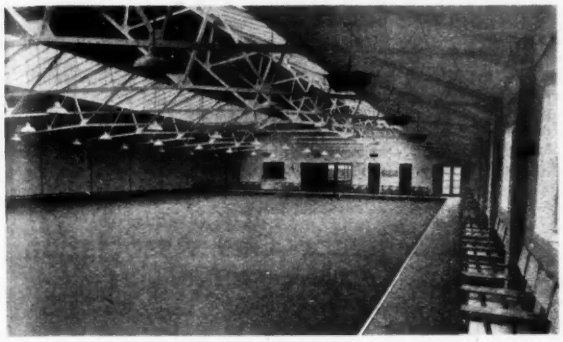
The American Gas Association has published a book by Dr. Scott Ewing on "Soil Corrosion and Pipeline Protection." It is the result of sifting and collecting in an organized manner the vast amount of published information on the subject, and setting out this information in convenient form for the aid of engineers operating pipeline systems. The Corrosion Committee of the American Gas Association some years ago started a programme of research on pipe coatings and corrosion. The original data collected during this programme have been largely presented before meetings of the Association. During the work of the Corrosion Committee data were collected from various published sources as well as from the results of the research work conducted by the Author. The extensive data so collected could be made of effective value only by its collection into a single volume.

The subjects dealt with include: Pipeline systems in the United States, soils and pipeline corrosion, corrosion in distribution systems, corrosion survey methods, bituminous and related coating materials, methods of applying coatings, inspection of pipe and coatings, relative performance of coatings, and cathodic protection and electrolysis. The address of the American Gas Association is 420, Lexington Avenue, New York.

This Christmas window display was specially prepared by the Parkinson Stove Company, Ltd., and exhibited at the showrooms of the Altrincham Gas Company. As will be seen, it features two well-known Parkinson products—the "Renown" cooker and "Super-Ray" gas fire.

Gas Installation for Indoor Bowling Club

The Boston Indoor Bowling Club was officially opened on Dec. 10, and comprises an indoor bowling green, billiards room, card room, locker rooms, refreshment room, directors' office, bar, and kitchen. Gas was chosen exclusively for heating the whole of the premises, in addition to providing subsidiary lighting and kitchen equipment.



The Bowling Green, showing Overhead Gas Heaters.

Bowling Rink.—The Bowling Rink, which measures 110 ft. long by 64 ft. wide, is heated by seventeen Bratt Colbran overhead radiant heaters (wedge pattern) fitted at a height of 9 ft. 6 in. from floor level. Each heater is independently controlled by a "Newbridge" switch.

Club Rooms.—These are heated by Bratt Colbran "Mortimer" heaters as follows: Billiards Room, two 2-unit and two 1-unit size heaters; Card Room, two 2 unit size heaters; Locker Rooms, one 1 unit size heater in each of two locker rooms; and Directors' Office, one 2-unit size heater.

These heaters are finished in an attractive shade of bronze to harmonize with the interior decorations.

Kitchen and Bar.—Gas equipment includes a "New World" cooker, a coffee urn, and an "Ascot" boiling water appliance. The latter, besides providing boiling water for soft drinks, serves the washing-up requirements.

Subsidiary Lighting.—The building is lighted by electricity generated by the Club's own plant, consisting of a Ruston diesel engine and generator. Gas cylinder wall brackets complete with by-passes provide illumination in the Club Rooms, bar, engine room, rink, &c., between the period of shutting down and starting up the electric generating plant. There are fifteen of these gas brackets, finished in chromium plate and fitted with sunset shaded cylinders. The attractive appearance of these brackets is superior to the electric ceiling fitting, and will be the means of enhanced prestige for gas in this direction.

The whole of the gas installation was carried out by the Boston Gas Light and Coke Company, who at all times were ahead of schedule. During the cold spell of weather which preceded the opening of the Club, the workmen engaged on the interior of the building, assembling billiards tables, laying the rink floor, installing the electric lighting plant, &c., had every reason to be glad of the warmth provided by the gas equipment, not to mention the provision of light.

A Corner of the Refreshment Room, showing Gas Radiator, Wall Bracket, and a glimpse of the Gas Cooker in the Kitchen beyond.

An outside gas lamp provides illumination over the entrance gates to the courtyard of the Club.

Gas Cooker for "Cinderella"

[Reproduced by courtesy of the "Daily Mirror."

The "New World" cooker provided the rostrum recently for a final rehearsal of "Cinderella," written and produced by Mrs. Victoria Williamson, of Stoneleigh, Surrey. The photograph shows her three charming daughters being put through their final paces a few minutes before they were due to appear on the stage at the Little Theatre, Epsom.

The New Hire Purchase Act

A Valuable Exposition

A lucid and concise explanation of the Hire Purchase Act which comes into force on Jan. 1, and the new responsibilities placed upon traders engaged in hire purchase transactions is contained in a valuable book by Mr. Richard B. Hurton and issued by Bankers Commercial Security.

In a brief foreword Sir Harold Webbe points out that the Act has the general approval of trades in which various forms of lengthy credit is customary and, like so much of our legislation, now makes compulsory reasonable provisions which for long have been the standard practice of many firms. Sir Harold adds "this object can certainly be achieved if the public, the trade, and those who advise upon and administer the law will adhere to the spirit as well as the letter of the Act, and avoid creating a situation in which Parliament might feel obliged to introduce amending legislation which, by imposing more rigid conditions, might seriously handicap legitimate trade."

Mr. Hurton, who is Chairman of the Hire Purchase Trade Association and an authority on the subject, has included the full text of the Act in his book and then in simple terms explains each section which he feels might require elucidation. He states clearly what it will now be incumbent upon traders to do in order to make their hire purchase agreements watertight, and their powers and methods of procedure in regard to unsatisfactory transactions.

It is difficult to see how any trader following the advice given by Mr. Hurton could possibly err in regard to such requirements of the Act as statements of cash and hire purchase prices, description and quality of the goods, simultaneous agreements, successive agreements, and the procedure to be adopted when trouble arises.

B.C.G.A. Conference at Edinburgh

Under the auspices of the British Commercial Gas Association, a District Conference was held at Edinburgh on Dec. 14, when a large company saw the Industry's new programme of films in the New Picture House.

Following the film display a number of those present visited the Edinburgh gas showrooms at Atholl Place where a fire was seen, fed with "Grancole," a new smokeless fuel. The visitors were also shown a fire in which graded gas coke was being burned.

A company of approximately 140 were subsequently entertained at lunch in the North British Station Hotel, Councillor William Duncan, Convener of Edinburgh Gas Committee, presiding. Others present were Lord Provost Henry Steele, Edinburgh, with the Lady Provost; Sir William Sleigh, ex-Lord Provost of Edinburgh; Mr. John G. Galloway, Master of the Merchant Company of Edinburgh; Mr. Wm. Y. Darling, Treasurer of Edinburgh; Mr. P. J. Lucas, Secretary of the B.C.G.A.; Colonel Carr; Mr. James Jamieson, Engineer and Manager, Edinburgh; Mr. Walter Muter, Past-President of the B.C.G.A.; and Mr. H. A. Aitken, President of the North British Association of Gas Managers.

At the Luncheon (left to right)—The Rt. Hon. Henry Steel (Lord Provost of Edinburgh), Councillor Wm. Duncan (Convener of the Edinburgh Gas Committee), the Lady Provost, and Provost Fergusson, of Peebles.

The CHAIRMAN said that the Edinburgh Corporation Gas Committee had decided that this would be an opportune time to open an exhibit of solid smokeless fuel and appliances at the Atholl Place showrooms. Those who had seen that exhibit and the new films must have been impressed with the manner in which the social services rendered to the public by the Gas Industry had been portrayed. The use of gas played a vital part in the health of the nation. The comparative lack of sunshine in this country, as compared with other lands, made it essential to avoid the presence of any deleterious matters in the air which cut off the sunrays.

Mr. John G. Galloway, J.P., proposed "The City and Royal Burgh of Edinburgh." Lord Provost Henry Steele replied.

Treasurer Wm. Y. Darling, C.B.E., M.C., proposing the toast of "The Gas Industry," said the Gas Industry was the nation's third largest ratepayer and the seventh largest direct employer of labour. He was all in favour of a newer and cleaner Edinburgh. "Down with King Coal and up with King Coke," he concluded.

Replying, Mr. H. A. Aitken, President of the North British Association of Gas Managers, said that since there was no known treatment which could compare with the gas-works process of carbonizing the raw coal and recovering the by-products, the Gas Industry would of necessity play a prominent part in the economic solution of the important problem of how the national fuel resources could be utilized to the best advantage and how the smoke abatement problem could be solved. The remedy in this connexion appeared to lie in a carefully planned and comprehensive policy embracing all fuel. The Edinburgh Corporation Gas Department and Mr. Jamieson had recently furnished a highly important contribution towards a solution of this problem in the investigations and research carried out in regard to the production of a free-burning solid smokeless fuel which could be offered to the public at an economic price.

Mr. Walter Muter, replying to the toast of "The Guests," proposed by Councillor Edward Walker, Chairman of the Public Utilities Committee, Edinburgh, said the soot deposit in Edinburgh as registered in the gauges was higher in the residential districts than in the centre of the city, proving that the domestic hearth was the greatest sinner in this respect. He would pay a tribute to the work of Sir David Milne-Watson, that distinguished Edinburgh man, who was rendering such service to the national economy.

Sir William Sleigh, ex-Lord Provost of Edinburgh, proposed a vote of thanks to the Chairman.

New Subsidiary of R. & A. Main, Ltd.

Water Heating Department Adopts New Title

Owing to the steady development in the manufacture and sales of "Main" water heaters for domestic purposes it has become necessary for the firm to place this special department on a different basis, and therefore, from the beginning of the New Year, it will be known as "Main Water Heaters, Ltd.," a subsidiary company of R. & A. Main, Ltd.

Messrs. Main believe that it will be advantageous if their many friends in the Industry are brought into more direct contact with the water heating side of their business, so that they may be afforded improved facilities both for stimulating sales among the public and for subsequent service to gas undertakings and users.

Scottish Junior Gas Association

(Eastern District)

Some fifty members of the Scottish Junior Gas Association (Eastern District) took part in a visit to the showrooms of the Dundee Corporation Gas Department on Nov. 26.

Mr. J. Wilson, Engineer and Manager of the Department, welcomed the visitors, and hoped they would have an enjoyable and interesting afternoon. Mr. A. C. Rea presented a Paper on "Practical Considerations in Mainlaying."

By special invitation many Past-Presidents of the Association were present, including Messrs. J. Dickson, Dundee; W. Brown, Burntisland; Jas. J. Scott, Cowdenbeath; Alex. McDonald, Prestonpans; J. Scobie, Stonehaven; and D. M. Garrie, Tayport.

Athletic and Social

The Horseferry Players.

In their first production of the present season the Horseferry Imperial Players secured the best performance they have yet given. Merton Hodge's "The Wind and the Rain," which they did at the Guildhall School of Music Theatre on Dec. 12, is not too easy a play for amateurs, but, states the *Daily Telegraph* critic, this company got the right idea at the very beginning and kept it with more than moderate success.

Brian Healy, John Maylam, Albert Mote, and Gordon Underwood made four convincing medical students, and there was successful "atmosphere" by Kitty Brooks as their Scottish landlady. These made a splendid quintet, and there was useful support from Joan Hager, Grace Prosser, Ronald Herberte, and Dennis Healy. Jose Glynn produced convincingly.

The Horseferry players are, of course, members of the staff of the Gas Light and Coke Company.

A Seasonable Display

In producing this display, John Wright & Co., Ltd., have endeavoured to break entirely new ground, and without resorting to the usual Father Christmas and holly, they have prepared something seasonable and topical. The length of the display is approximately 6 ft. 6 in., with the background carried out in cream and red, and the little figures sitting round suitably coloured, each being a separate unit, and cut out. The fire is made to allow it to be illuminated from the back to give it the effect of being alight.

National Gas Council

Meeting of the Central Executive Board

A Meeting of the Central Executive Board of the National Gas Council was held at Gas Industry House, S.W. 1, on Dec. 13—Sir David Milne-Watson, Bart., D.L., LL.D., in the Chair.

The Late Mr. J. E. Cowen.—Before proceeding with the business of the meeting, the Chairman referred with deep regret to the death of Mr. J. E. Cowen, Chairman of the Newcastle-upon-Tyne and Gateshead Gas Company. He had for many years been associated with the Gas Industry, and more particularly as President of the British Commercial Gas Association in the year 1925-26. His loss would be deeply felt, and the sympathies of the Board went out to his friends and relatives, as well as to his Company.

The Late Mr. Octavius Thomas.—The Chairman said that he had only just learnt of the sudden death of Mr. Octavius Thomas, an unfailing supporter of the Gas Industry both in Wales and nationally. He had always been a loyal comrade and colleague, and his loss would be keenly felt.

A vote of sympathy to the relatives of both Mr. Cowen and Mr. Octavius Thomas was passed, the members standing in silence.

Resignation of Major Kitson from the Leeds City Council.—The resignation was reported of Major G. H. Kitson from the Leeds City Council, which would also necessitate his resignation from the Board. Having regard, however, to the very great assistance rendered by him to the Board in his capacity of Vice-Chairman and to his great knowledge of gas matters, it was unanimously agreed to co-opt Major Kitson a member of the Board.

Fourth Annual General Meeting of the B.G.F., Nov. 2.—A short Report on this matter had been circulated. It was added that Lord Kennet had agreed to act as President of the Federation for the forthcoming year.

Air Raid Precautions.—A Report on this matter which had been circulated was considered.

Hire Purchase.

(*a*) **Model Form of Hire Purchase Agreement.**—It was reported that, in pursuance of the resolution passed by the Board at their meeting in July, Counsel had now drafted the following Model Forms, which complied with the provisions of the new Hire Purchase Act:

(i) Hire Purchase Agreement for use either in the case of ordinary or prepayment meter consumers;
(ii) Credit Sale Agreement for use in the case of prepayment meter consumers;
(iii) Credit Sale Agreement for use in the case of ordinary meter consumers; and—
(iv) Form of Notice under Section 20 of the Act.

These Model Forms had been circulated to all members of the Council in England and Wales.

Benzole Recovery.—A letter from the National Benzole Company, Ltd., dated Dec. 5, 1938, had been circulated as a result of which it was agreed that the Council should issue a circular letter to all its members impressing upon them the desirability of washing gas for the recovery of benzole, pointing out that, in an emergency, difficulty might very well be experienced in obtaining the necessary plant, and referring members to The Institution of Gas Engineers for any technical information which might be required.

Railway Rates and Charges.—It was reported that a circular letter from the Railway Companies' Association dated Nov. 30, with enclosures, had been circulated. Sympathy was expressed with the claim put forward by the railway companies to be relieved from restrictions imposed upon them at a time when they possessed a virtual monopoly.

Conjoint Conference of Public Utility Associations.—A report of meetings of the Executive Committee, the Rating Committee, and the Council of the Conjoint Conference had been circulated.

Federation of British Industries.—The following representatives were re-appointed to serve on the undermentioned Groups:

(*a*) Main Group 9, Section 1, Chemical Fertilizers and Explosives:

Mr. E. V. Evans.
Mr. R. W. Hunter.

(*b*) Main Group 14, Sub-Group 3, Public Utilities:

Mr. John Terrace.
Mr. H. C. Smith.
Mr. S. S. Ogilvie.

Date of Next Meeting.—It was agreed that the next meeting of the Board should take place on Tuesday Feb. 14, 1939.

Do Gas Undertakings Neglect the Sale of Scrap?

By a Scrap Merchant

Countries, they say, get the governments they deserve. It is tempting to add that gas undertakings get the scrap merchants they deserve.

The modern Gas Industry is one of the most highly organized and efficient services in this country, or so at least it appears to one whose most familiar connexion with it is to be served by it both as an industrial and domestic consumer.

Continual research has resulted in steady improvements in plant and processes from which the public benefits by getting better and cheaper gas. Waste is anathema to the producing side of the Industry, and skilled chemists have evolved a hundred and one by-products with a thousand and one uses as well as obtaining economical primary production.

The sales side of the business is catered for with large handsome showrooms both industrial and domestic, knowledgable and capable representatives, and an efficient and comfortable housed office staff. There is no waste of time, material, or efficiency through inadequate equipment.

And in all his propaganda the persuasive advocacy of Mr. Therm preaches against the evils of wasted energy in cleaning the home after smoky fires, the evils of wasting food through lack of a refrigerator, the evils of wasted space when only half a house is properly warmed.

It is strange, then, to find that in the matter of disposing of scrap metals many gas undertakings are deplorably casual—not to say wasteful. It is as if once they had decided that any plant was only fit for scrap it was merely a waste of time to worry their heads about it and give serious consideration to the problems of disposal. In many companies scrap is collected haphazard by a number of dealers, and the full value is not received by the seller.

At the other end of the scale, of course, there are large concerns which handle their scrap as they handle every other phase of their activities—with the very utmost efficiency. They issue tenders at regular intervals for the purchase of their scrap which has been carefully sorted and classified, and which can be purchased confidently by the scrap trader. Indeed, many dealers buy from them without inspection for the qualities are regular and vary very little from time to time. The companies in this category naturally receive the highest prices and the very best possible service in the disposal of their scrap, because they attract competition from the reputable merchants who are eager to place their service and organization at the command of those who appreciate it and know best how to profit by it.

An hour or two spent in the consideration and classification of the various types of scrap metals to be cleared (for example, obsolete plant, repair scrap, old gas mains, &c.), followed by a request to half a dozen reputable and experienced merchants to come and quote for it, is an hour or two very profitably spent indeed. The result is that the very highest market prices will be received whatever the material for disposal.

The scrap merchant can also be invited to co-operate in the dismantling and removal of obsolete plant which he has the organization and experience to tackle and which he can deal with in the works without interrupting normal activity or diverting the undertaking's own labour from productive or expansive work.

It is essential to the large scrap merchants to run a transport fleet of heavy duty lorries, and many undertakings work with their merchants under contract for collection and removal at regular intervals. This avoids the accumulation of unsightly dumps, which are wasteful of space, cause congestion, and are bad for prestige. Many concerns work the regular collection system, and, when for any reason there is an unusually large collection, invite quotations as well.

It must be remembered, however, that no two undertakings in the whole Industry have identical problems. It is impossible to give anything but the most general advice; and perhaps the soundest piece of general advice is to say send for a representative of a reputable firm of merchants—or firms of merchants. They will be only too glad to discuss your problems and to advise you.

Apply the same technique and demand the same standards of service in dealing with scrap merchants as is demanded from your suppliers, your engineers, your sales and service staffs. Scrap, instead of being a nuisance to be got rid of with the minimum of bother, will become quite a profitable aspect of your business.

UNJUSTIFIED DISCRIMINATION ALLEGED AT

Newcastle Coal Prices Enquiry

An Enquiry into 1939 contract prices for Durham unscreened gas coal, requested by the Newcastle-upon-Tyne and Gateshead Gas Company, was opened by the Durham District Investigation Committee in Newcastle on Friday, Nov. 25, and later adjourned until Dec. 16. The opening proceedings were reported on p. 722 of the "JOURNAL" for Nov. 30.

On the resumption the greater part of the proceedings was again held *in camera*. Mr. T. P. Ridley, Secretary and General Manager of the Gas Company, completed his evicence in private, and the case was openea for the Durham Executive Board.

Dr. *J. Charlesworth*, for the respondents, contended that the price fixed for the complainants was fair and reasonable. They denied discrimination and claimed that rail or road borne trade was entirely different to seaborne trade. The former could be based on pithead or delivered prices, but, of necessity, seaborne business had to be based on f.o.b. values. The reason for the setting up of Coal Sales Control Committees in August, 1936, was to attempt to regularize prices and secure proceeds which would enable the mining industry to pay better wages and give a reasonable return on capital. The scheme did publicly what was done in other industries—coke, for instance—privately and secretly. Everybody knew that Mr. T. Hornsby and his colleagues fixed the prices of Durham coal, but in other industries no one outside the industry knew who fixed the prices. The complainants had used the term "monopoly powers" in regard to the Sales Committee, but it was a wrong term as the Committee had no monopoly in coals. They only fixed and controlled prices. Dr. Charlesworth suggested the Gas Company itself was a good example of a monopoly. It was the statutory gas supplier in the area and nobody else was entitled to supply gas. That was a monopoly. Those wanting to buy gas could buy it only from the Company or go without.

It was immaterial to the sales committee from which pits the Gas Company bought its coal providing it was not on account of price. In fixing the price this year for 1939 contracts at 18s. 6d. the Sales Committee had to take into consideration production costs in 1939 and the trend of trade. In July, 1937, as a result of consultations with the National Gas Council, it was agreed that prices be raised by 4s. 3d. a ton on the 1935 prices, and the price charged to the Gas Company for Class B2 gas coal, with the increase, was 17s. 9d. a ton. When that price was fixed there was not at the time any indication of important items increasing the cost of production. It was also agreed that consumers pay a further 1s. a ton voluntarily on all deliveries of coal still to be made under 1935 contracts, of which there were still considerable quantities outstanding.

At the time the 1937 price was fixed, production costs per ton in Durham were not more than 14s. 4d. Between January and August this year costs had risen by a further 1s. 5d. If the Sales Committee had increased the price of gas coal by 1s. 4d. a ton, instead of the 9d. increase actually charged on the 1937 price, it would not have been at all unreasonable. Coal production costs in 1939 were likely to be higher than in 1938 by about 6d. a ton due to charges in connexion with holidays-with-pay and new safety in mines regulations. Having regard to the price of 13s. 6d. at the pithead which the Company was charged in 1935 it did make one think when looking at the losses of the coal industry at that time that the Gas Company was able to increase its business and reduce the price of its gas because the price paid for the coal was not fair and reasonable. It suggested the complainants had been getting their coal too cheaply.

It had been stated that the crux of the Enquiry was whether it was fair to charge 18s. 6d. at the pithead to local consumers while London undertakings were supplied at 19s. 6d. f.o.b. He contended that if it was thought that the London price, which, in his submission could not be reduced to a pithead price except as an arbitrary average, was unreasonable, then it did not follow that the Newcastle price was unreasonable. The London price, he submitted, did not affect the Newcastle price.

Dealing with 1939 production costs, Dr. Charlesworth said so that Durham miners' wages be paid at the minimum of 70% on the basis rates out of proceeds, it was necessary that average 1939 prices for all classes be 17s. 4d. For certain classes of coal it was not possible to get 17s. 4d., and therefore the average had to be made up on the better classes. The Company's coal was of that class and the 18s. 6d. charged for it was just sufficient to make the average of 17s. 4d. To secure the wage increases the miners hoped for, a higher average than 17s. 4d. was essential. On this argument, the Sales Committee contenced the price was fair and reasonable. The Gas Company mace comparison of its own and London prices, continued Dr. Charlesworth, by endeavouring to reduce f.o.b. prices to pithead prices. Durham had for inland disposal about 7,000,000 tons of gas coal a year, of which some 6,500,000 tons was disposed of coastwise and the remainder was rail or road borne trade.

It was the customary and businesslike way to sell coastwise coal on a f.o.b. basis and rail borne coal on a pithead or delivered basis. The Committee had to take into consideration the cost of coal delivered to distant consumers. If they were unable to sell that large quantity of coal to London consumers then it might adversely affect production costs and hence prices to local consumers. For the purpose of co-ordination between districts, some basic price was essential—and that basis was an f.o.b. one. On a delivered basis, the Gas Company got its coal at about 20s. 4d. to 20s. 10d. a ton according to the colliery from which it was received, distance to be covered, &c. The Committee contended that it cost London consumers about 24s. 4d. delivered and not 23s. 2d. which the complainants suggested. In any case, they got the advantage of geographic proximity to the coal mines. If one took into consideration what the Company got for its residuals, the price of coal was reduced to 6s. 4d. a ton. What other industry, counsel asked, got its coal as cheap as that?

The Gas Company was a large producer of coke, and it was interesting to note that the price of coke was controlled through a private organization. Between 1935 and 1937, the price of coke went up by 9s. a ton while the price of coal went up only half that amount. Between 1937 and 1938 coke prices went up 3s. as compared with 9d. a ton increase asked for coal. In 1937 the Company was securing coal supplies at 17s. 9d. a ton but was getting 27s. 5d. a ton for its coke. That seemed staggering to his mind, and he hoped it would appear in the same light to the Investigating Committee.

Evidence for the Durham Executive Board was opened by Mr. *Thomas Hornsby* (Chairman of the Durham Coal Sales Control Committee), who said the Committee was an independent one and none of its members had any financial interest whatever in the coal trade. He outlined the work and objects of the Committee and said as far as possible they tried to avoid fluctuations in the price of coal and certainly did not try to exact the uttermost farthing from the consumer. Mr. Hornsby went on to relate conversations between the National Gas Council and the Durham Coal Sales Control Committee regarding contracts and prices and at this point requested that the hearing be held *in camera* as his evidence was of a confidential nature.

The CHAIRMAN agreed, and it was announced that when the private evidence was concluded, the hearing would be adjourned until Jan. 6 in Newcastle.

Midland Juniors

At a meeting of the Midland Junior Gas Association held at the Council House, Birmingham, on Dec. 1, 1938, Mr. F. A. C. Pykett, Distribution Engineer, City of Coventry Gas Department, read a Paper entitled "The Distribution of Gas at Coventry."

The President (Mr. A. W. Attwood) read a letter from Mr. R. J. Milbourne expressing his regret that he was unable to be at the meeting in order to present the Milbourne Medal to Mr. W. L. Howe, of Nottingham, and tendering his congratulations to the winner.

In the absence of Mr. Milbourne, the President presented the Medal to Mr. Howe and congratulated him on behalf of the Association.

ADVANTAGES AND DISADVANTAGES IN THE Production and Distribution of a Low Quality Gas

by
ERIC B. FIELD,
Assoc.M.Inst.Gas E.

From a Paper to the Manchester and District Junior Gas Association held at Blackburn on Dec. 3.

For many years prior to the adoption of the Gas Regulation Act, 1920, there was active controversy on the question of the "Relative usefulness of gas of different heating values" and there were two schools of thought—namely:

1. Those who believed that the available heat delivered to a customer in the form of gas was the useful commodity for which the customer paid and the amount of heat delivered was a measure of the service rendered.
2. Those who regarded the meter readings as a true measure of the service rendered.

From 1913-1917 the Bureau of Standards, U.S.A., conducted a series of investigations upon the question and proved that within the range of commercial gases studied they all could be used with substantially equal efficiency in all of the appliances investigated.

Later came the investigations of the Research Committee of The Institution of Gas Engineers, whose findings were accepted eventually in their entirety by both the Gas Industry and the Board of Trade.

The Committee devoted their attention to the study of gases of calorific values ranging from 240-550 B.Th.U., and the conclusions reached coincided with those arrived at earlier by the Bureau of Standards, U.S.A.

The conclusion of the two bodies was "that for all practical applications the value of the gases within the range studied was directly proportional to the heating value, or, in other words, a definite quantity of heat is of the same value to the consumer whatever the volume of gas containing it."

The intentions of Parliament in passing the 1920 Act have been realized. The efficiency of gas manufacture has risen, statutory requirements of the Act have been met, cost of gas making has been reduced, and the sale of gas has been increased to domestic and industrial consumer with increased satisfaction.

Although during the past eighteen years there has been a lowering of calorific value of the gas distributed, the drop has not been drastic when one studies the following table of allocation of calorific values:

1937.

Declared Calorific Value. B.Th.U. per Cu.Ft.	Number of Undertakings.	% of Undertakings Declaring.
200	1	0·1
270–380	5	0·6
400–440	103	12·2
450	203	24·1
460–470	76	9·0
475	93	11·0
480–490	41	4·8
500	292	34·6
510–600	30	3·6
	844	100·0

It will be observed from the table that 500 B.Th.U. quality enjoys the greatest popularity, 450 B.Th.U. following next in order, and, as the London Companies are included in the undertakings serving 500 B.Th.U. or over, the point assumes great significance.

Moreover, during recent years when certain undertakings have decided upon a change in declared calorific value, it has usually been in an upward rather than a downward direction, which leaves the impression that the manufacture of the higher quality results in a cheaper therm.

It is common knowledge that a lower quality results in an increased gaseous yield per ton of coal carbonized, and it is frequently stated that it is wrong to strive for a high gaseous yield without taking many other points into consideration, the chief of which are:

1. Situation of the undertakings in relation to the several coalfields.
2. Potential local market for the chief by-product, coke.

It would appear that if present manufacturing methods are to continue, then the correct calorific value to be supplied by any undertaking is that which favours the production of the cheapest therm in view of the market, both as to extent and as to value, for the principal by-products.

It is difficult and unwise to contrast results of undertakings without taking into account the differing local conditions.

Carbonizing Plant at Blackburn.

Glover-West continuous vertical retorts were installed and put to work in 1922 at the Greenbank Works of the Blackburn Corporation Gas Department.

Previously, gas was manufactured at two works, coal gas from inclined retorts at Greenbank and carburetted water gas at Addison Street Works—a combination inefficient from the standpoints of both Department and consumer alike.

In common with other undertakings, the Blackburn Corporation Gas Department had been obliged by the enforced economy in coal consumption to reduce the calorific value to 450 during the war years, so that the consumers were prepared for a reduction in the calorific value. Indeed, the fact that the new plant easily maintained a quality which never varied more than a few B.Th.U. on any occasion gave the consumer so much satisfaction that he was under the impression that the quality, at 425 B.Th.U., had been improved.

The new vertical installation consisted of twelve beds of eight retorts, each bed served by its own producer.

The output of the plant was rated at 3 million cu.ft. of 425 B.Th.U. gas per day. Coincident with the erection of the plant described, a great amount of research work was carried out by the Gas Investigation Committee upon the subject of steaming in vertical retorts, the report of the Uddingston tests was published, and certain modifications to existing plants became apparent.

After a short period of work the new setting at Blackburn was partially reconstructed in two stages, in order to incorporate certain features necessary to the efficient use of the steaming process.

At this time the producers were enlarged and the plant then had a rated output of 6 million cu.ft. of gas per day, the throughput per retort being increased from 50 cwt. to 60 cwt. per 24 hours.

The cost of the plant including the reconstruction was £194,000, equivalent to a capital charge of £48 per 1,000 therms sold per annum.

Effects of the New Plant.

The introduction of the new carbonizing plant had a marked effect on the finances of the undertaking; increasing output was met without difficulty, the composition of the gas

TABLE I.

Year.	Net Cost into Holder. Pence per 1,000 Cu.Ft. of Gas Made.	Gas Sold. Million Cu.Ft.	Price of Gas.
			s. d.
1922	20·80	910	4 4
1929	14·94	1,071	3 6
1936	12·92	1,002	3 6
1937	12·92	982	3 6
1938	13·11	958	3 6

became steady, resulting in increased satisfaction to the consumer, and the price of gas was reduced by 28% in four stages during the first five years' working.

No alterations of major character were made to the setting until the present year, when two beds were completely reconstructed.

Advantages and Disadvantages of a Low-Quality Gas.

The writer intends to present a record of results and experiences gained in the production of a 425 B.Th.U. gas over a period of years.

It is generally agreed that vertical retorts suffer in comparison with other types of systems when choice of coal is to be made: and in our case, where a high yield of low-quality gas is required, choice falls between fine limits. From time to time sample supplies of various slacks have been treated, in an endeavour to reduce the average price of our coal, but always without success.

Coals with a tendency to produce a swelling coke have also been used over short periods, but in every case trouble in working has been experienced, with consequent reduction in gas-making efficiency.

Where water gas production is practised to a great extent within the retort, coal must conform strictly to two standards:

(*a*) It must not swell unduly in the top portion of the retort.

(*b*) The coke produced must be highly reactive in order to gain optimum results from the water gas reaction.

Our results are affected to a greater extent by the physical characteristics than by the chemical analysis of a coal, a fact borne out on many occasions when a coal showing satisfactory analysis has been subjected to working conditions.

We normally use washed nuts drawn from nineteen different collieries, in the proportion of 65% Yorkshire, 35% Lancashire; and while this may appear to be a very wide choice, the analytical, sizing, and other characteristics give a fairly uniform blend.

At the present time we are enjoying an advantage over those undertakings which have normally purchased slacks and lower-grade qualities, as the price increase of the latter has been disproportionately greater than that of the selected fuels, but in view of the conditions prevailing in the coal market to-day and the problematical future before us, it is difficult to imagine how long this state of things will last.

Carbonizing Costs.

Practice has successfully established the production of a lower-quality gas in vertical retorts by increased steaming, resulting in a reduction in the amount of coke for sale. The policy at Blackburn has been to obtain the highest practicable gaseous yield, an object which, once attained, has a tendency to produce a false sense of satisfaction.

Extra fuel required for producers and carbon converted to water gas when steaming become very important points when high gaseous yields are established. These two points gave us anxiety some time ago. It was noticed that coke to producers was increasing out of all proportion to the increase in gaseous yield, to such an extent that coke available for sale had reached the extremely low figure of 5·3 cwt. per ton of coal.

Certain repairs carried out, coupled with altered methods of working, have reduced the producer figure from 22·3 lb. to 16·8 lb. per 100 lb. coal, thereby increasing the saleable coke figure to 6·9 cwt. per ton of coal.

The main factor in the economics of gas production is the net cost of coal, a figure that has always been subject to fluctuation due to the vagaries in the residuals market.

At the present time the Industry is faced with a heavy burden in this respect; coal prices have been subjected to severe increases which have every likelihood of remaining permanent, and unless the price of coke can be kept at existing or higher levels the finances of gas undertakings are likely to be seriously affected.

For many years the coke market has been in a state of chaos; competition even between the various gas undertakings has existed, but no doubt the greatest effect has come from the coke oven producers, who, during the slump years unloaded their surplus into what was once our exclusive domain.

During the past year or two our new competitors have been busily employed satisfying the demands of the steel industry, which has been enjoying boom conditions, and in consequence the domestic and small industrial coke market has reverted to the Gas Industry. It is difficult to predict the effect of a return to normal trade in the steel industry, but surely a reappearance of competition may be expected in our markets.

It may be argued that the sale of coke can be harnessed in the form of District Coke Associations, similar to the London and Counties scheme, which has operated with success for some seven years, but any such scheme will be faced with the disposal of an increased production in a limited market.

Gas undertakings are contributing somewhat to their own difficulties in respect of coke, as industrial, commercial, and domestic coke users are rapidly being converted to gas, with the result that the coke displaced, together with that necessary to the production of the additional gas, must be placed on an already congested market.

Taking into account the many factors affecting the sale of coke, it would appear that those undertakings which are producing a low-quality gas and a minimum of saleable coke will have the greater opportunity of enjoying the economic advantages of the future.

In the case of Blackburn, the annual make of coke meets the local demand under normal trade conditions, and it can be assumed that any excess could only be disposed of at prices which would reduce the average.

From examination of the records of the Undertaking it can be shown that the annual net coal cost should have been at a lower figure than that obtainable if the calorific value had been at a higher level during the period.

TABLE II.—*Comparison of Net Coal Cost with Different Calorific Values.*

Year.	Cost of Coal per Ton.	Value of Coke per Ton Sold.	425. Net Cost per Therm of Gas Made.	450. Net Cost per Therm of Gas Made.	475. Net Cost per Therm of Gas Made.	500. Net Cost per Therm of Gas Made.
	£ s. d.	£ s. d.	d.	d.	d.	d.
1922–23 ..	1 8 2	1 5 11	2·25	2·30	2·34	2·52
1929–30 ..	1 2 1	0 18 8	1·81	1·85	1·93	2·09
1935–36 ..	1 1 1	0 16 10	1·80	1·86	1·90	2·66
1936–37 ..	1 2 11	1 1 3	1·83	1·87	1·89	2·04
1937–38 ..	1 4 4	1 5 0	1·85	1·86	1·88	2·00

Some explanation is necessary to show how comparison with the higher value is reached, and at the outset it should be understood that the reasoning is based upon the fact that continuous vertical retorts were in operation.

Using our results as those to be expected for a 425 B.Th.U. quality, reference is made to a Paper, "Complete Gasification in Vertical Retorts," by M. Barash and T. A. Tomlinson, of West's Gas Improvement Company, Ltd., which was presented to the Institute of Fuel in March, 1932.

In the Paper a set of graphs was shown, the calculations for which had been based upon a mixture of theoretical considerations and practical observations on a class of coal, bearing close resemblance to the average used in our plant.

The graphs have become standard works of reference for users of vertical retorts, and from one of these—published in the "JOURNAL" for March 30, 1932, and reproduced here—it is possible to calculate the results to be expected when carbonizing coals of predetermined quality to produce gas of various values.

The results to be expected are as follows:

—	Therms per Ton of Coal.	Saleable Coke, Cwt. per Ton of Coal.
450 B.Th.U.	94	9·0
475 ,, ...	90	9·4
500 ,, ...	80	10·0

Considering a similar class of coal and producing a 425 gas our returns are:

24,000 cu.ft. (102 therms) per ton of coal
6·9 cwt. saleable coke ,, ,, ,, ,,
18·1 gall. tar ,, ,, ,, ,,

On reference to the graph it is seen that our saleable coke figure is 1·2 cwt. less than that attainable under the conditions mentioned, and in compiling the net cost of coal in

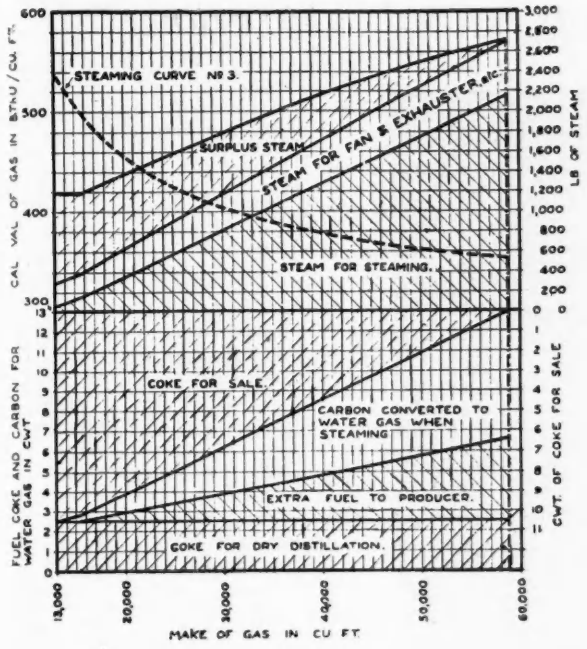

STEAMING CURVE No 3.
SURPLUS STEAM.
STEAM FOR FAN & EXHAUSTER, etc.
STEAM FOR STEAMING.
COKE FOR SALE.
CARBON CONVERTED TO WATER GAS WHEN STEAMING
EXTRA FUEL TO PRODUCER.
COKE FOR DRY DISTILLATION.
CAL. VAL. OF GAS IN B.Th.U./CU. FT.
FUEL COKE AND CARBON FOR WATER GAS IN CWT.
LB. OF STEAM
CWT. OF COKE FOR SALE
MAKE OF GAS IN CU. FT.

Fig. 1.

Table 1, the writer has made a similar deduction from the results to be expected from the other qualities.

Maintenance, Repair, and Renewal Costs.

The net cost of gas into holder is largely influenced by maintenance and repair costs after making allowance for the net coal charge, and it is essential that they should be kept at a minimum commensurate with proper upkeep of works.

On examining the net costs of gas into holder shown in Table 1 it is seen that the figures do not compare well with those of many undertakings and it is necessary that explanation should be given, otherwise the impression may be gained that the quality of gas under discussion is the contributory factor.

It is general practice for gas companies and most corporation undertakings to create a reserve fund to meet extraordinary renewals and repair which occur from time to time.

In these circumstances ordinary maintenance and repair is met out of revenue and shown in the cost of gas into holder, abnormal repairs or renewals due to be carried out at lengthy intervals being satisfied from reserve.

For a period of years prior to 1932 it was customary for the greater portion of the net profit accruing from a year's working to be taken for the relief of rates, a measure which resulted in the Blackburn Undertaking facing a deficit which has since had to be eliminated.

It will be appreciated that in these circumstances it is impossible to create a reserve fund; therefore repair and renewal charges even of an abnormal nature are placed against cost into holder for the particular year in which they are carried out.

Repairs, maintenance, and renewal costs for the last six years were as follows:

	Per 1,000 Cu.Ft. of Gas Made. Pence.
1932	3·49
1933	3·68
1934	3·47
1935	2·83
1936	3·34
1937	3·09

During the period extensive repairs and renewals, which are not likely to recur for many years, have been undertaken, especially in connexion with the carbonizing plant.

Eight beds of retorts have been reset or reconstructed since 1933, other major repairs have included the rebuilding of producer and non-producer walls, renewal of the majority of top-ironwork, and replacement and strengthening of steel buckstays and cross-ties.

During the years 1936 and 1937 all bottom castings were taken down and fitted with new extractor worms at an approximate cost of £3,000.

The policy of carrying out extensive repairs and renewals to the carbonizing plant recently is based upon the following facts:

(1) The interest and sinking fund charges on the plant, amounting to £15,500 annually, become extinguished in 1941.
(2) We shall then have a plant bearing no capital liabilities, which should give efficient service for a further period.

Control of Carbonizing Plant.

The balance of a plant producing a low-quality gas in one operation is inclined to be upset by small variations in working, which would no doubt pass unnoticed when a higher calorific value is being made.

It is essential that the temperatures in the lower combustion chambers should be high and that complete combustion of the producer gas should take place in these chambers, otherwise hot tops will result followed by uneven working of the charge in the retort.

When steaming down to 425 B.Th.U. quality the heat absorbed by the water-gas reaction necessitates very close attention to the working of producers, and it is our experience that clinkering and other duties concerned in this direction should take place at the widest possible intervals. During the past few years we have changed from an eight-hour clinker and four-hour break-up to a twelve-hour clinker only, with beneficial results.

Apart from the careful maintenance of heats it is essential that the coal-throughput/steam ratio should be properly estimated and kept steady at all times, so as to prevent wide variations in the composition of the gas.

It is our practice to carry out frequent analyses of the gas in the laboratory, and, in addition, daily analyses of the crude gas from each bed are made for CO_2 and CO.

The safeguards taken when retort leakage appears has an extremely adverse effect on the water gas process, for, to prevent damage taking place in other parts of the setting, it is common practice to cut down the existing draught conditions in the heating chambers, which results in lowered temperatures. On many occasions we have found it preferable to empty a retort and carry out gunpatching, rather than take the safeguards mentioned, as it is frequently found that the three remaining retorts are capable of producing more gas than the half bed under the changed conditions.

It would appear that the production of the lower quality gas demands extra technical attention.

Coke Quality.

Blackburn coke is typical of that expected in vertical practice; certain features such as open texture, low moisture content, and easy ignitability make it a desirable fuel for domestic and small industrial users. It has the disadvantage of being extremely light and easily fractured when handled, resulting in a high yield of the smaller sizes of low saleable value.

It is our practice to use unscreened coke for the firing of producers, thus disposing of a proportion of the breeze and smaller sizes, fines taken out by the screens being used for the firing of Lancashire boilers.

The presence of dust and fines has a detrimental effect on the efficient working of the producers, a dense core being formed down the middle of the fire, resulting in gasification tending to occur up the sides only, with consequent troubles, such as reduction in quality and quantity of producer gas, high carbon content of ash withdrawn, and deleterious effects on the linings.

The wide adoption of pressure producers has largely overcome the difficulty of breeze disposal and the trouble mentioned in the previous paragraph was completely eliminated following upon the installation of one of the type at our works a short time ago.

We found that the central core of finer size was gasified

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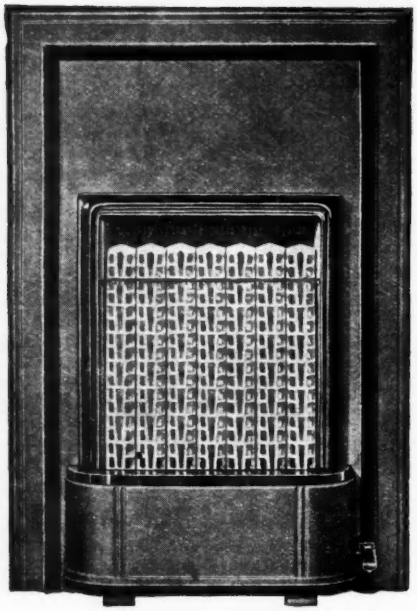

Literature obtainable on request.

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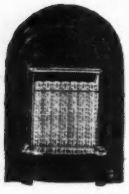

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even when working at very low grate pressure, and it is intended to convert all producers to pressure firing in the future.

Tar.

The yield of tar is high, as is to be expected when heavy steaming is practised.

We have a small local demand for pitch and creosote oil and a portion of our tar production is treated in a Hird continuous distillation plant, crude naphtha and light oil also being recovered in the process.

The crude tar is characterized by a high acid content.

The oils are entirely liquid and show no tendency to deposit solids even after long standing, and it would appear that the creosote obtained from vertical tars in general and from tar obtained from verticals accompanied by heavy steaming in particular, will form an ideal product for hydrogenation.

Benzole Recovery.

Benzole recovery as practised by the high quality undertaking is not economic when considered in relation to a gas of 425 B.Th.U. quality.

This question can be considered from two angles in the case of the works producing high quality gas:

(*a*) As a means of regulating quality and flexibility.
(*b*) As a consumer of gaseous therms involving no service costs.

Wherever naphthalene washing plant is installed it becomes economical to regenerate the wash-oil, and this of necessity results in the production of benzole and naphtha.

Treated in this manner there is a definite return from this plant, but when treated as either (*a*) or (*b*) above, the question assumes altogether different aspects.

The vertical system of retorting allows of the production, directly, of that quality with which the consumer is to be supplied, there being no question of producing a higher quality and reducing down by—

(*a*) extraction of hydrocarbons,
or (*b*) dilution with other gaseous mixtures.

In normal circumstances and where carbonizing plant when correctly operated cannot produce down to the required calorific value, also taking into account that the Hydrocarbon Oils Act is apparently assured of a long life, benzole recovery, treated from the consumer angle, is a profitable adjunct to such undertakings.

The same case cannot be made out for an undertaking in which extra coal must be carbonized deliberately, resulting in reduced carbonizing efficiency in order to supply a hypothetical consumer.

The plant installed at Greenbank is merely auxiliary to the naphthalene washer and consists of preheater, still, fractionating column, reflux condenser, and oil cooler, all continuous with the washer.

Oil circulates at approximately 45 gallons per hour and is stripped of its absorbed vapours *en route* from one side of the washer to the other, benzole quality being regulated by thermostatically controlled water supply to the reflux condenser.

Considered as an oil regeneration unit the plant shows a profit of 3·457d. per ton of coal carbonized, made up as follows:

Balance Sheet.

	Pence per Ton of Coal Carbonized.		Pence per Ton of Coal Carbonized.
Expenditure—		Income—	
Capital charges—oil washer, 10% per annum on £2,400	1·108	Benzole ..	3·724
Water	0·100		
Steam	0·360	Naphtha ..	1·755
Capital charges on regenerative unit, 10% per annum on £400	0·184		
Oil used in process	0·270		
Profit	3·457		
	5·479		5·479

If treated as a benzole plant, allowance must be made on the expenditure side for extra net coal carbonized and thermal losses as distillate, which in our case would result in a loss on the process of 1·428d. per ton of coal carbonized.

Building activity during post-war years has caused rapid expansion of our cities and towns, with the result that the utility suppliers have had to keep pace with the movement.

Unfortunately, the outward trend has not always been accompanied by a proportionate gain in the number of gas consumers; consequently, increased distribution costs have become prevalent, and it is common to find capital for distribution exceeding that employed on the production side.

When extension of supply is under consideration, low quality is at a disadvantage as compared with the higher quality gas, as extra main capacity or increased initial pressure must be adopted to counteract the deficiency of thermal energy, and, should high pressure with its attendant charges become necessary solely on this account, redeclaration of quality might be considered advisable.

We have experienced no trouble in respect of shortage of supply, mainlaying having been carried out to the limits of our area, but it should be mentioned that assistance to this end has been gained in three ways—namely:

(1) Our manufacturing station is situated at a lower level compared with the majority of the outlying district.
(2) Gas is distributed from two points at opposite sides of the town.
(3) The trunk mains and primary feeders are of ample capacity.

Utilization.

Never at any time in the history of our Industry was efficient utilization of gas more necessary than it is to-day. We are faced with competition from other forms of light, heat, and power, and it is incumbent upon us to ensure that the supply we offer fulfils the term "gaseous energy, 100% satisfactory in use." For many years it has been the concern of the gas engineer to produce and distribute gas of good quality, within reasonable limits, but recently it has become apparent that this standard alone is insufficient to satisfy modern requirements. With increasing scientific design and production of appliances, certain properties of the constituents of gaseous mixtures and their effects when burned have been subjects of research, and, although divergence of opinion exists as to methods of test, it is agreed that composition and specific gravity are points of paramount importance.

Specific Gravity.

It has been stated* that this property in town gas mixtures is in the main dependent upon the following factors:

(1) The percentage admixture with coal gas of carburetted water gas, blue water gas, producer gas, or waste gas.
(2) The quantity of oil used for carburetting.
(3) The quantity of benzole extracted.
(4) The inert content of the gas.

The likely range of gravities where benzole extraction is practised and/or water gas is used for load balancing and quality regulation is therefore subject to considerable variation, unless a definite effort is made to control it. Several gas undertakings have attempted this, and have found that without material disturbance of works operations, limits of, say, 0·40-0·50 can be maintained, but any narrowing becomes increasingly difficult.

There appears to be no reason why a low-quality gas produced in vertical retorts with steaming should be subject to such wide variation, and from records of tests taken daily at our Greenbank Works over the last twelve months it has been found that the specific gravity has varied between 0·487 and 0·501, a difference of 0·014, as compared with 0·100, using other systems of manufacture to produce higher quality gas.

Composition.

A change in gas composition may affect the performance of a gas appliance using aerated burners in two ways, it may alter the B.Th.U. input by changes in calorific value and specific gravity, or it may alter the character of the flame, in particular the height of the inner cone.

* Changing Influences in Gas Manufacture. E. G. Stewart; I.G.E. Communication No. 155.

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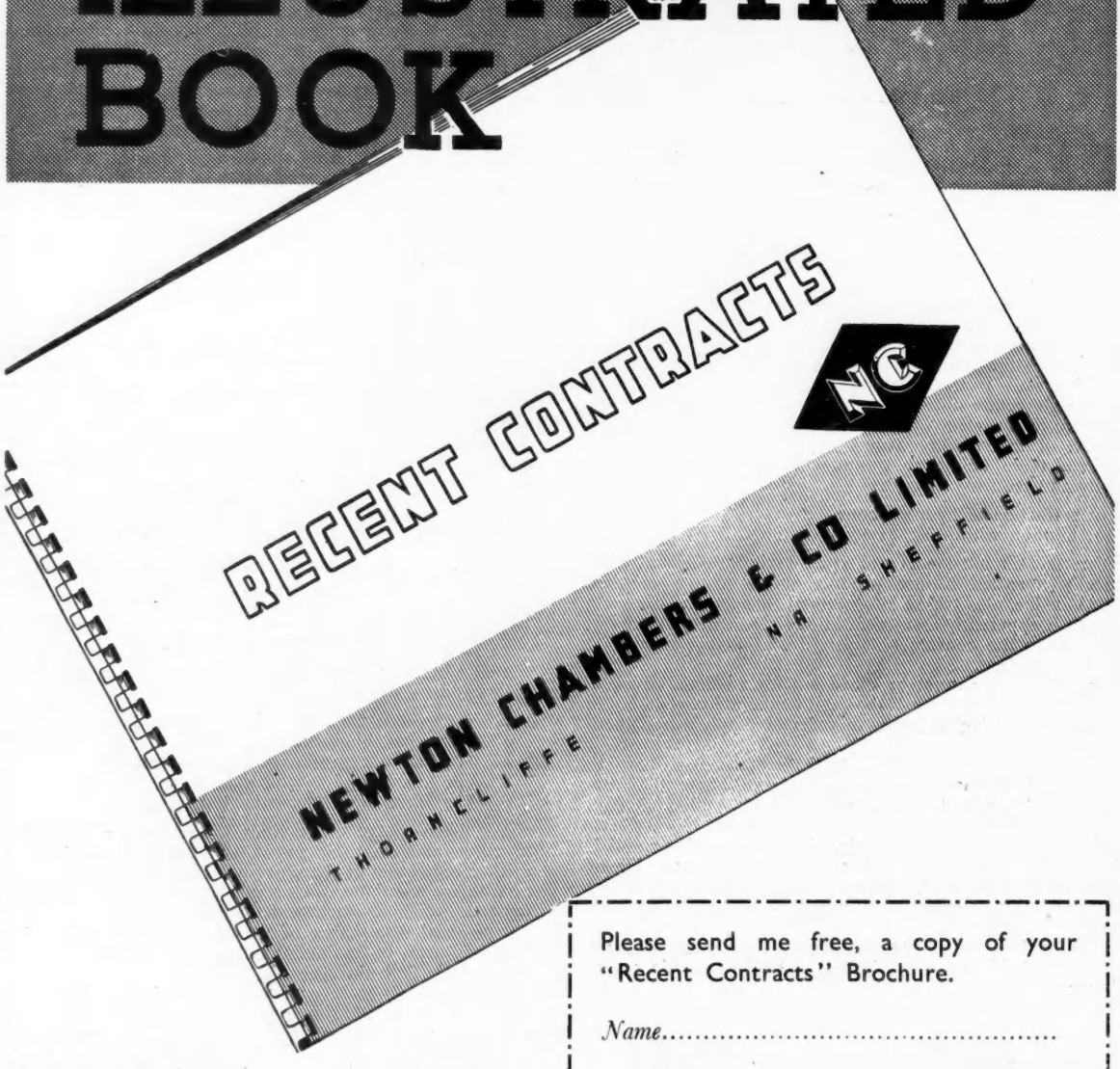

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Combustion data concerning the 425 gas under discussion show the following characteristics:

(1) High carbon monoxide content,
(2) Low methane content,
(3) Low unsaturated hydrocarbons,

all having pronounced effects on flame performance.

The mixture burns with a hard flame and small inner cone, and from existing information on the subject it can be safely stated that the A.T.B. number of such a gas will be low, with tendency to noisy operation and back-lighting in the event of lowering of the value, due to alteration of composition.

The greatest difficulty in the utilization of the low-quality gas is that the appliances available are normally designed to work on gases of higher calorific value and vastly different composition.

It may be of interest to mention that we have had no experience of gum trouble either on works or district, rather pointing to the fact that gum forming agents in the gas are at a minimum, especially when it is considered that gas drying and naphthalene washing have been practised for 8 and 14 years respectively.

It would appear that there is a greater tendency towards gum formation in the production of the higher quality gases by static methods of carbonization than in the case of low-quality gas produced in vertical retorts with heavy steaming.

Discussion.

The PRESIDENT (Mr. H. Platt, of Bolton), said the Author of the Paper had covered the subject in great detail, and from every point of view. The main issue, however, was not the yield obtained per ton of coal carbonized, but the results shown in the balance-sheet.

Mr. W. HODKINSON (United Kingdom) said that within the last few months he had investigated the position of a company operating in South Wales, where difficulty was experienced in getting down to a calorific value of 435 B.Th.U., using a Welsh coal. The ash in the coal was 5·4%, but the ash in the coke was 13-14%, which made it almost impossible to develop a coke market while such a quality was produced. Under normal conditions, producing a gas of 500 B.Th.U., the ash content of the coke would be 8-9%. Development of the town had taken place on the outside edge, with the result that the trunk mains were not of sufficient capacity to meet the increased demand. In view of the circumstances, it was definitely advantageous to re-declare at 475 B.Th.U. He had always been inclined to view benzole production as a satisfactory consumer, and one that did not require additional distributing expenditure. Benzole was worth 1s. to 1s. 1d. per gallon, or 8·5d. per therm. The charges on the benzole plant would be from 2d. to 2½d. per gallon, leaving a balance of 6d. per therm for gas, which was good in view of the fact that industrial loads of a less volume were eagerly sort after at 4d. per therm.

Mr. J. ALBINSON (Manchester) was of the opinion that the incidence of capital charges might have been stressed more strongly. In the early days of the Industry, labour was undoubtedly the biggest charge. The introduction of machinery had gradually increased, until now the relative cost of labour is small and the cost of capital high. It would seem that the determining factor was the maximum utilization of plant for coal throughput. In considering the question of producing 500 or 250 B.Th.U. gas, it must not be overlooked that the capital expenditure would be greater, since larger ancilliary plant would be required for the same heat output. There would also be the question of larger mains, and the difficulty of obtaining perfect aeration at the burner with the increased pressure of gas that would be necessary to obtain more therms.

Mr. S. CARTER (Liverpool) reminded the members of the old argument that "one B.Th.U. is as good as another." He could not agree with all that had been said about vertical retorts suffering in regard to the selection of coal. During 1927 they received several qualities of coal which could not be dealt with in the horizontal retorts, but they could do something with them in the verticals. The quantity of coke available for sale, even allowing for heavy steaming, was rather low. At Linacre, steam was supplied to the adjusting valve at 2 lb. pressure, and they were able to obtain 21,000 cu.ft. per ton, or 90 therms, and sell 9 cwt. of coke per ton of coal carbonized. Gas undertakings contributed to their own difficulties. If additional gas was sold, then difficulty usually arose in getting rid of the additional coke. Undertakings with a C.W.G. plant had a definite advantage in this respect. In times of emergency, coal could be used to the best advantage by steaming very highly and by using the coke on the C.W.G. plant. In other words, it would mean coal into the works and only ashes out. He had also found that too frequent attention to the furnaces resulted in inferior producer gas, and also to an extravagance in the quantity of fuel used. At Linacre they had reduced the time of clinkering. Instead of clinkering every four hours they were now clinkering every eight hours. There had been a considerable saving in fuel and no deterioration of the producer gas.

Mr. A. ORMROD (Oldham) enquired if the Author could give an analysis of the coke produced, in addition to the coal analysis. It would appear that more ash would be liberated in the retort by the procedure adopted at Blackburn. Had any effect been noted on the retort brickwork? Was it more marked than when making a 475 B.Th.U. gas?

Mr. S. H. LAWRENCE (Nelson) said that the prices of coke appeared to be low, and he would also like to know if the figure of 6·9 cwt. of coke available for sale included the coke used on boilers. Could the Author state the percentage of breeze in the coke as discharged from the retort house?

Mr. FIELDS, in reply to the discussion, said that he agreed with Mr. Albinson's remarks in regard to capital charges, but they must not look to the past but to the future in formulating a policy. In a recent Paper it has been pointed out that coke was a curse and resulted in gas being manufactured at luxury prices. Low-grade gas mitigated against that trouble. If a burner was set for a particular gas there should be no unsurmountable difficulty in burning it. Steam at 2 lb. was a low figure. At Blackburn it was necessary to steam heavily to get 425 B.Th.U. gas; otherwise the retorts were not working to full capacity. The ash content of the coke was 8% and the C.V.M. 1·5%. With regard to the question of the effect of ash on the retort, Mr. Fields said that he was not prepared to give a reply. In a recent Institution Paper it had been stated that after 12 months' working there were leaky retorts. They had no leaky retorts at Blackburn until after the best part of two years' work. The price of coke at Blackburn for 1928 was 28s. per ton after all labour charges had been deducted. At the present time they were obtaining 30s. He agreed that the quantity of coke available for sale could be very much improved. At the present time there was only one waste-heat boiler, and there was room for at least one more, if not two. This would increase the quantity available for sale.

Mr. ALBINSON, in proposing a vote of thanks to the Author, said the crux of the whole matter was whether the Gas Industry was to continue to supply gas and coke or to become purely a supplier of gas. There were some undertakings which could supply a low grade gas, but other undertakings, such as the London companies, would have to seek other methods. There were great possibilities in the Fischer process.

Mr. H. BURNET (Blackpool) seconded the vote of thanks.

In acknowledging the vote of thanks, Mr. FIELDS stated that the sulphur content of the gas was 20 grains, and they were only able to reduce by 10% to 18 grains.

Manchester and District Junior Gas Association

Visit to Blackburn

One hundred and twenty members of the Manchester and District Junior Gas Association visited the Greenbank Gas-Works of the County Borough of Blackburn on Dec. 3. Tea was provided by the Gas Committee in the Whalley Range School.

Mr. A. K. COLLINGE (Preston), in proposing a vote of thanks to the Chairman and members of the Gas Committee, said that they were all greatly impressed by the spaciousness and cleanliness of the works. Mr. D. BENSON (Bolton) seconded the vote of thanks.

Councillor H. JOHNSON (Chairman of the Gas Committee) expressed pleasure that so many members had visited the works. Those who were not technically connected with the Gas Industry had to meet a pessimism from the public in regard to the Gas Industry, and one pleasing feature, from the Committee's point of view, was the fact that the public were now being educated in regard to what gas could do for them. Pessimism would be dispelled if the public had been present during the afternoon and seen the youthful element of the Gas Industry and the enthusiasm that was so evident. The results at Blackburn could not be obtained if the junior members of the staff did not do their work to the best of their ability. He was connected with an industry which was asking for a square deal. The Gas Industry also required a square deal in the face of the intensive competition.

Alderman R. CULSHAW (Vice-Chairman) said he thought the Gas Industry had little to fear. He had been round the works with the members, and if the ratepayers would visit the works they would be convinced of the wonderful asset they possessed.

Mr. J. D. ASHWORTH (Engineer and Manager) also said how delighted he was to have such a large number of Juniors visiting his works.

Mr. E. B. FIELD (Assistant Engineer and Manager) then read a Paper on "Advantages and Disadvantages in the Production and Distribution of a Low-Quality Gas."

Gas Distribution at Coventry - - - -

by

F. A. C. PYKETT,

Distribution Engineer, Coventry Gas Department.

From a Paper before the Midland Junior Gas Association on Dec. 1.

Fig. 1.

Prior to 1927 the City of Coventry comprised some 4,147 acres, the population was approximately 140,000, and the gas consumers 39,733. The present-day figures are: City area 19,167 acres, population 224,000, gas consumers 71,217. I should, of course, mention that the gas area is considerably greater than that of the City, comprising 80,000 acres, or 126 square miles.

Fig. 1 shows the gas area prior to 1927, together with the present-day area and extent of mains.

The mileage of mains has been doubled since 1927, from 217 to 454 at the present time. Estate development is usually on large lines. It is looked upon as fairly small development if the number of houses is below 250. The general development comprises estates of 1,000 to 3,000 houses. In addition, there is a large section of land on the west side of the City which has been planned by the City Engineer. This area covers some 2,234 acres, and will eventually have thereon about 8,000 dwellings. The layout embraces all the amenities of a garden suburb, with recreation grounds, parks, and wooded areas. Such information enables one to allow for the necessary trunk mains, and these are laid even though the immediate demand is far below their capacity. In several areas on the outskirts of the City 18-in. trunk mains are being laid, which at the present time are being supplied with gas through a network of smaller mains, but eventually the process will be reversed and gas will be supplied into these trunk mains from a high-pressure ring main through reducing governors.

Having in mind in 1927 this possible development of the City, the question of delivering gas to outlying areas was a problem. It was practically impossible to think of laying new trunk mains from the station governors, the route in most instances being through the town and busy shopping areas. A decision was made to install a ring main around the outskirts, capable of delivering gas at high pressures to various proposed governor stations at outlying positions. To assist in deciding the route of the main the following information was obtained and plotted on a large 6-in. scale map: Manufacturing station; distributing governor stations; governor areas, numbered and coloured; trunk mains, 24 in., 18 in., 12 in.; proposed town planning roads; area, total gas, scheduled for industrial development, scheduled for domestic development.

Upon investigation it was found that difficulties would arise if the route were to be along existing thoroughfares. These either came too near the centre of the City for the main to serve any useful purpose on the outskirts, or, alternatively, so far into the outskirts as to be of little use for the development likely to take place within a reasonable period. Furthermore, the length of the main required along the latter route would be excessive. It was fortunate that the proposed town planning roads came in a position between the two, and the route decided upon embraced a large section of these proposed roads. The majority of the roads are now constructed, and there has been no interference with the main during the laying of other public utility supplies, which speaks well for the information given to us by the City Engineer's Department prior to the main being laid. Incorporated in this high-pressure distribution scheme was a supply line to Kenilworth and Bedworth, two Undertakings purchased by the Coventry Corporation. Bulk supplies are taken into the existing holders at these two works and they are now used as distributing stations, manufacture of gas having ceased. It was also decided that the high-pressure distribution scheme should embrace an additional supply from the manufacturing station at Foleshill to Gas Street, for having only one cast iron connecting main was cause for anxiety. Had anything occurred to put this out of commission it would have been practically impossible to maintain adequate supplies throughout the district. The size of the high-pressure main decided upon was 15 in., with 15-in. branch feeder to Gas Street. Branch supplies to Bedworth and Kenilworth were 6 in. and 8 in. respectively. The 6-in. and 8-in. mains were double hessian wrapped, but the 15-in. main was sheathed with a covering of bitumen ¼ in. thick. The joints adopted were of the long sleeve type, and welded. Each section of main was tested with air at a pressure of 100 lb. per sq.in., and each joint examined after washing with a solution of soap and water in addition to a period test. The average working pressure in the main is 10 lb., but delivery at the compressors can be increased to 20 lb. when required. The compressors, in duplicate, each having a delivery of 250,000 cu.ft. per hour, are of the Michell crankless type.

Controlling Supplies.

The method of controlling the distribution is as follows: The gas is manufactured at Foleshill Works and stored in three holders having a combined capacity of 8½ million cu.ft. The 24-in. connecting main takes gas from Foleshill into the single holder at Gas Street. There are now three station governors taken off this connecting main. Attendants on duty at Gas Street regulate the supply from Foleshill and to the town. When the demand arises the boosters at Foleshill are put into operation. The present boosters are in duplicate, each unit capable of discharging 1 million cu.ft. of gas per hour at 60 in. W.G. pressure.

The pressure at the outlet of the boosters is increased according to the demand, and is usually in the region of 45 in. W.G. at peak load period. With these high pressures in operation it was necessary to install on the inlet side of the three station governors mentioned previously diaphragm regulators to control the pressure to the bell type of station

governors. The latter governors have since been discarded and the regulators now control the supply, acting as station governors, with satisfactory results.

The distribution control at Gas Street comprises one gasholder, 2 lift, capacity 900,000 cu.ft.; one booster house, in which is installed an electrically driven booster having a 24-in. oil dash flap valve and diaphragm control regulator on the outlet; one governor house with six station governors, one excess pressure regulator A (fig. 2), one 24-in. high-pressure regulator B, and one 24-in. low-pressure regulator C. The latter also serves as a safety governor in case the supply to the town were inadvertently turned off.

The usual method of operation is to take gas into the holder and thence to the station governors. As this holder does not throw sufficient pressure for peak load periods, the booster at Gas Street is put into operation to increase the pressure on the inlet side of the station governors. The pressure is regulated by the diaphragm regulator on the outlet of the booster, and, as a safety measure, if this were too high the excess pressure regulator A would open and return the excess gas to the holder.

An alternative method of control is to take the supply from Foleshill direct to the inlet of the station governors through the low-pressure regulator C.

The method of operation is as follows: Pressure is increased at Foleshill boosters to ensure an adequate supply to the town, and this is judged by the holder at Gas Street which must be rising. The high-pressure regulator is adjusted to come into operation at a pressure slightly below that thrown by the holder. Valve D is closed, thus stopping the supply to the holder via the west side of the buildings. (Note that gas is still passing to the holder via the east side of the buildings.)

To bring the regulator C into action the flap valve in the booster house at Gas Street is closed, and finally valve E.

The regulator is adjusted to give an outlet pressure of 65-tenths and the high-pressure regulator re-adjusted to an outlet pressure of 63-tenths. When the Foleshill boosters have been increased to 45 in., which is considered a pressure high enough for the joints of the cast iron connecting main, the demand for gas at Gas Street is augmented by the high-pressure regulator. In case the supply failed for any reason whatsoever the flap valve would automatically open and place the town supply on the Gas Street holder.

Pressure records are taken in each governor area at about 10 positions every 2 years. These enable one to observe whether supplies are adequate. Minimum pressures at peak load periods are plotted on a 6-in. scale plan of that particular district. Station governor pressures are adjusted to assure a minimum of 3 in. at the furthermost point. To obtain even pressures on the district generally pressures at the station governors are increased gradually to a peak point, and then correspondingly reduced. This method is easy of operation by water loading governors. By this means fairly even pressures are obtained generally on the district.

In rapidly growing districts recording charts are taken at more frequent intervals than the two years mentioned.

Low-Pressure Distribution.

For low-pressure distribution cast iron mains with open socket joints are used throughout. A consignment of asbestos pipes has been purchased for experimental purposes, and these have just been laid. It is obvious that these pipes and their method of jointing would be useful for emergency repairs, particularly having in mind Air Raid Precautions. They are easy to handle and cut.

Spun pipes are used in 16-ft. and 18-ft. lengths. To ensure pipes of even bore, it is specified when purchasing that the pipes must always be manufactured from moulds of the same bore and the internal diameter of the pipes must not vary more than $\frac{1}{8}$ in. Run lead joints are used on 4-in. and 6-in. pipes, and a combination of yarn, lead wool, yarn and run lead on all sizes above 6 in. Cabells pull-through stoppers are used when laying mains, a process which enables the gas to travel along as the work proceeds. This method also ensures no air being in the main and eliminates any likelihood of an explosive mixture.

Branch connexions to existing mains are made by means of under-pressure drilling. On 12 in. dia. and larger sizes a special cutting machine is employed if the main has to be severed for any purpose. This ensures accuracy for connexions. Also on work of 12 in. dia. and larger sizes, salvus sets and antipoys sets are part of the equipment and must be used when bagging the main. Double bagging is always employed. A Novox set is also on the site in case any workman should be overcome by gas. All such special apparatus is in charge of one man who directs its use, and he is responsible for its safe return to the stores, where he cleans it to ensure that it is immediately ready for further requirements. A mechanical syphon pump mounted upon a motor lorry is employed. The duties of the two men with this unit include, in addition to clearing syphons, the testing of all district valves and repairs to valves and syphons. A

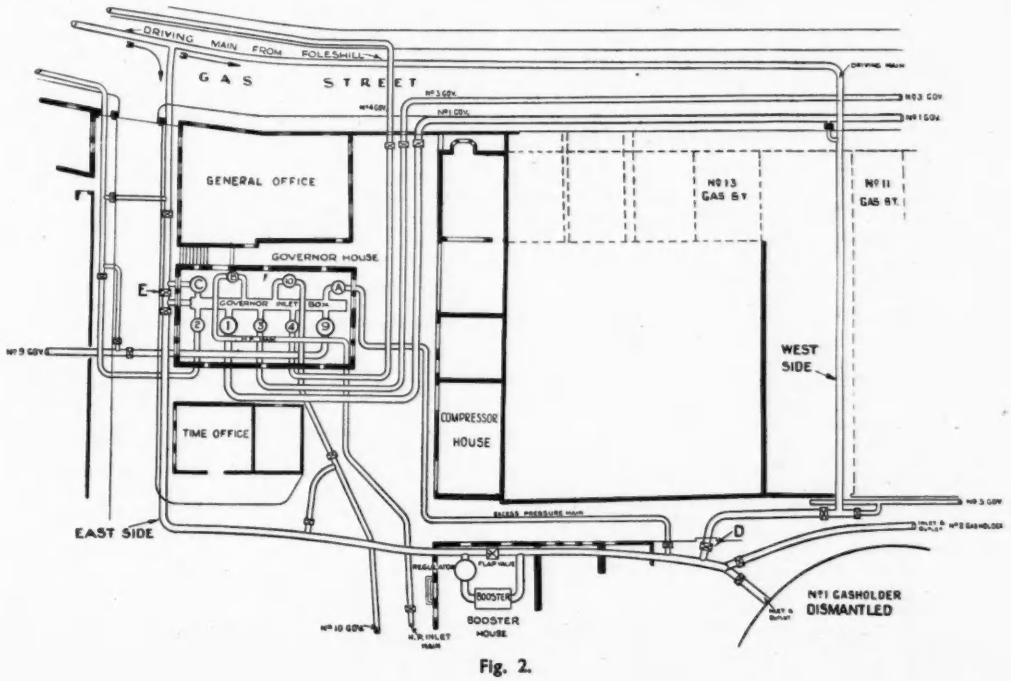
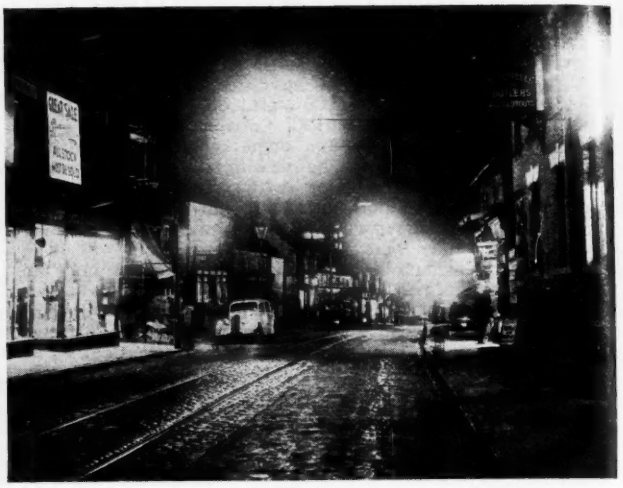


Fig. 2.



Sharman main finder and Box finder are part of their equipment, and have proved particularly useful. Careful records of the work of these men are kept and the districts are divided into weekly, fortnightly, monthly, bi-monthly, and 3-monthly periods.

High-pressure governors and low-pressure regulators are carefully examined periodically, and all diaphragms oiled and exchanged when required. Records are kept of the amount of rust found in the high-pressure governors, but up to the moment it has not been sufficient to justify the fitting of rust traps. Electric hand lamps are kept in each governor station. Emergency repair tools are kept in a large receptacle outside the stores, which are available quickly after working hours when the stores are closed.

Gas services are laid in gas strength tube protected in square wood troughing with lid in which is placed a mixture of sawdust and tar. Services have been in use for approaching 50 years, and when removed found to be in excellent condition. You will appreciate the additional cost of this protection is well repaid.

Records and Costs of Mains and Services.

Records of work carried out in this section are plotted on plans of 1/500 scale. It is necessary to make all these plans and bring the older ones up to date. For this latter purpose greater efficiency and accuracy can be obtained by first using an electrical eraser. Architects' block plans of estates are usually 1/500 scale which facilitates the making of our district plans. Mains are plotted in their approximate positions in the footpath or carriageway. The year the work is carried out is stated, together with the size and depth. Services are also shown up to the meter position in the property. I am convinced this method is superior to any embodying record books. Workmen in this department report once per week at the depôt, work cards and instructions being at all times taken out to them by the inspectors. All outstanding job cards are returned to the office each month, with a record of the time and materials used to date, to enable monthly records of costs to be tabulated.

The expenditure upon mains and services is met principally by loan, and this is limited by the Ministry of Health to requirements not exceeding 3 years and to sizes below 12 in. diameter. Special application has to be made for 12 in. and sizes larger. In our case to facilitate the sanction a large 6-in. scale map in lettered sections has been submitted to the Ministry, with all proposed 12-in. and 18-in. diameter mains shown thereon. As development proceeds application is made to the Ministry for the expenditure for these larger sized mains, the proposed extension being shown on a 1/2,500 scale plan, together with a reference to the 6-in. scale plan in their possession indicating the lettered section. An estimate of the proposed extension must be submitted. When the total amount of the particular loan has been spent the following details must be submitted with a new application: Position of mains; date at which laid; size of main; length in yards; type of main laid; depth or cover over main; cost per yard.

Industrial Supplies.

Large industrial supplies call for special consideration. In many instances the works are several hundred feet from the thoroughfare. In such instances it is usual to recommend a meter house near the main entrance and take supplies underground to the various workshops. Mains of ample size must be laid if the usual low-pressure conditions are maintained, but, in many instances, this is expensive and smaller mains and medium pressure raising is recommended. This method, of course, ensures a constant supply to individual parts of the plant, because a governor must be installed to each shop or on each furnace, &c. One installation which has been in operation for over 5 years with every satisfaction comprises 20,000 cu.ft. per hour meter, rotary compressor, anti-pulsator between meter and compressor, outlet pressure baffler and receiver, and 120 yd. 4-in. steel main with Carlton joints delivering gas at 1 lb. pressure to heat treatment shop. Another installation is a 60,000 cu.ft. per hour meter, and is our largest consumer's meter. The design and layout are carried out by the Distribution Department. These installations are typical of some 20 installed during the past 5 years. For industrial consumers, meters up to and including 100-lt. size are hired. Above that size they are purchased. Most large industrial consumers have wet meters, where the capacity is above 6,000 cu.ft. per hour. We have fitted a number of meters of the B. & M. type for industrial consumers, and so far these have proved satisfactory.

The industrial output for the year ended March, 1938, was 1,183,367,000 cu.ft., equivalent to 42% of the total output.

Internal Fittings Section.

The control of the Fittings Department is in charge of one assistant who supervises 8 district inspectors controlling 100 fitters and assistants. The inspectors attend to all special enquiries, supervise their respective fitters' work, and inspect same on completion. This Department is responsible for the fixing of meters up to 250-lt. size. The standard domestic meters adopted are 80, 125, 250, and 450 cu.ft. per hour. These are dry meters in the standard high capacity cases. Carcassing of new property is carried out in compo pipe except in public buildings and works, where either gas or steam strength wrought iron or steel is used according to circumstances. The majority of the builders employ the Gas Department to carry out the carcassing. The supply to the cooker is provided free to the builder, but a charge is made for all other work. It is usual to carcass to cooker, copper, and geyser positions, and in many instances to bedroom and living room positions. All types and kinds of appliances are fitted for private customers, and this Department carries out the whole of the work except where any water connexion necessitates a lead wiped joint. It has

been our endeavour particularly during the past 10 years to improve the class of workmanship in this Department, and to this end we have fixed a standard for all new fitters employed. To receive consideration, applicants must have obtained the Final Certificate issued by the City and Guilds of London Institute. We do find, however, some of the best craftsmen are those who have served their apprenticeship in the Department, and we have many young men trained under the guidance of one of our District Inspectors—a man who has taken a keen interest in their welfare—and they are now first-class craftsmen, having a sound theoretical and practical knowledge of all modern appliances and general principles appertaining to their operation.

Maintenance of Appliances.

The Maintenance Department is the training ground for the sales staff, and as such has proved most successful. Applicants for employment are considered from the sales angle. The men employed undertake the regular maintenance of all appliances except multi-point and large single-point heaters and central heating units, which are done by skilled fitters. The men are trained to become specialists in the work they are engaged upon—lighting, fires, radiators, or sink-water heaters. I am convinced this specialization assures higher efficiency in the Department and better control. Lighting burners are exchanged for reconditioned ones three times per annum, fires cleaned and adjusted each 12 months, while water heaters are maintained twice per annum. This latter work is costly in Coventry, due to hard water, which necessitates special de-scaling apparatus and periodical exchange of the internal bodies of the heater. The whole of the labour in the Maintenance Department is free to consumers, a charge being made only for radiants for fires and small renewals on other appliances. All lighting burner renewals are free. As vacancies occur in the sales canvassing section men employed in this Department are given preference.

The Sales Department comprises three showrooms, one central showroom in Coventry and two branch showrooms, one at Kenilworth and one at Bedworth. The Central Showrooms are situated in a new and busy thoroughfare.

Demonstrations are given each week at the Central Showrooms and eight are given each year in halls in different parts of the area. In addition, special demonstrations and lectures are given in conjunction with various women's and men's organizations, school children, &c. Show houses in conjunction with builders and local furnishing firms are a speciality of which full advantage is taken and are a source of much additional business. Canvassing is continuous. This is a branch of selling which is most productive, as proved by the fact that our canvassers sold during the past 12 months, in addition to other appliances, 300 washing machines. The sales of canteen equipment to works, hotels, restaurants, &c., as a result of canvassing, during the past 3 years amounted to over £10,000. The value of such a section is obvious.

A feature of our sales organization is the permanent employment of a display artist. The expenditure in this direction is undoubtedly worth while. The advantage of being able to carry out any publicity at our own convenience is obvious.

Discussion.

The PRESIDENT said that the work of organizing the Distribution and Sales Section at Coventry had fallen very largely upon Mr. Pykett's shoulders. He thought they would agree that in twelve years Mr. Pykett had done remarkable work. He had gathered round him a staff and built up an organization of which he might well be proud.

Mr. J. H. WAINWRIGHT (Halesowen), in proposing a vote of thanks to Mr. Pykett, remarked that the use of asbestos pipes was more or less in an experimental stage at Coventry, and while they were more easy to handle than cast iron, he wondered if they would ever extensively replace spun or steel pipes for low-pressure work. Referring to the standard of gasfitters, he said he thought every undertaking should endeavour to get their men to attain a high standard, but it was very difficult, at any rate in the vicinity of Birmingham, to obtain the right type of youth who would attend classes sufficiently often over a long period to qualify for the final certificate.

Mr. W. MACNAUGHTON (Wolverhampton), who seconded the vote of thanks, congratulated the Author on the wealth of detail he had given in his Paper.

Mr. PYKETT, in replying to the vote of thanks, said his knowledge of asbestos pipes was very limited, but there was no doubt that they were easy to handle and joint. With regard to gasfitters' apprentices, at Coventry they insisted that they continue their studies at the technical school and obtain their certificates.

Mr. T. SMITH (Derby) referred to the method of remuneration for outdoor salesmen and asked if, at Coventry, such employees worked loyally upon a salary basis.

Mr. S. C. BENTLEY (Leicester) said it was obvious that Mr. Pykett had planned a good many years ahead.

Mr. PYKETT, replying to questions raised, said that at Coventry the outdoor salesmen worked on salary only and seemed well satisfied; the undertaking found the arrangement worked very well. In Coventry the water supply was very hard and all appliances were specified to be suitable for that type of water. It was quite a good idea to try to get people to put in a water softener, but he did not think many consumers would be prepared to go to the extra expense.

London Juniors Visit Neasden

Seeing How "Ascot" Water Heaters Are Made

There is much to impress the visitor to the Neasden works of Ascot Gas Water Heaters, Ltd. Our readers will doubtless recall the impressions we recorded some short time ago when we were the guests of the Company at the inauguration of their extensive factory. Such impressions, particularly vivid as regards the works' great technical efficiency and the excellent conditions under which its operatives work, were carried away by members of the London and Southern District Junior Gas Association after their visit on Dec. 7.

The Association were honoured by the fact that they were the first to have a meal in the magnificent new canteen now erected at the works. A combination of bright colours, pleasing lines, and correctly disposed lighting renders this latest amenity a most agreeable *rendezvous*, where provision for recreation has been provided. The canteen is served by a kitchen, which one is proud to note is "all-gas."

At the conclusion of tea, Mr. Leopold Friedman, Assistant Managing Director, welcomed the members on behalf of his co-Directors and himself. Having referred briefly to the new canteen, Mr. Friedman said the instruction room through which the members had been in the course of their tour of the works had also just been opened; there they would meet representatives of gas undertakings, who could spend three days there for instruction on water heating. The exchange of ideas in those three days would be most useul to Ascot's, and he hoped it would help the undertakings concerned. In conclusion, he mentioned that his father, Dr. Bernard Friedman, had been associated with gas cooking and instantaneous water heating for over forty years.

In reply, Mr. R. N. LeFevre, Immediate Past-President, thanked the Directors and officers of the firm for their hospitality and the guides for giving up their time. He congratulated the Company on the lay-out of their works and on the design and performance of their water heaters.

Scottish Junior Gas Association

(Western District)

Members of the Scottish Junior Gas Association (Western District) visited their President's Works at Greenock on Nov. 26.

After an inspection of the works the Association were entertained at tea in the Council Chambers, where they were welcomed by Provost DAVEY, who observed that the Gas Undertaking contributed £2,000 towards the relief of the rates. Councillor PORTER (Vice-Convener of the Gas Committee), after apologising for the absence of the Convenor, said that the vitality of the Gas Industry was evidenced by the fact that there were sixty young men present that day who had given up their Saturday afternoon to visit a gasworks and thus seek to increase their knowledge. The Industry was one of National importance, and he was pleased to see such interest being taken in their profession by the younger men.

Mr. E. G. SMITH (Dumbarton), the Vice-President of the Association, voiced the thanks of the members to the Greenock Gas Department for the facilities provided that day and for the hospitality they had enjoyed. He recalled former Greenock men who had been Presidents of the Association—Mr. Robert Gray, Mr. Ronald Keillor, and their present President, Mr. N. C. Sturrock. Greenock was going forward, and he was pleased to see that it was in the hands of men who had received their training in the Junior Association.

Mr. J. BELL (Engineer, Manager, and Secretary of the Dumbarton Gas Department) said a few words and recalled that he had been present at the inaugural meeting of the Association in 1904.

Mr. R. D. KEILLOR (Engineer and Manager of the Greenock Undertaking) also spoke.

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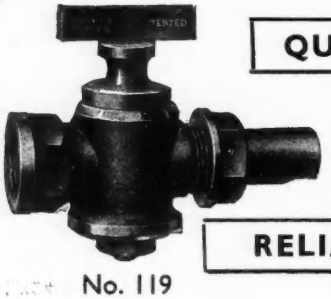

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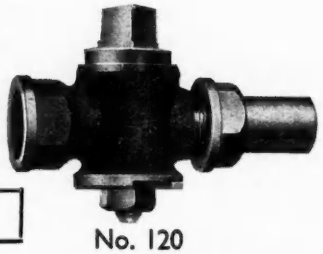


No. 120

— SAWER & PURVES —

(Branch of Meters Ltd.)
NELSON METER WORKS,
MANCHESTER, 10.
Telephone: COL 2289.

also at

RADFORD METER WORKS
NOTTINGHAM
Phone: 75202

DERBY ROAD
WATFORD
Phone: 2645

Markets and Manufactures

Current Sales of Gas Products

The London Market

LONDON, *Dec.* 19.

To-day's values of Tar Products in the London market remain as follows:

Pitch nominal at about 30s. per ton f.o.b.

Creosote, about 3¾d. to 4d.

Refined tar, 3¾d.

Pure toluole, about 2s. 3d.

Pure benzole, about 1s. 9d.

95/160 solvent naphtha, 1s. 7d. to 1s. 8d.

90/160 pyridine, 10s.

All per gallon naked at makers' works.

The Provinces

Dec. 19.

Crude Gas-Works Tar, 14s. to 19s.

To avoid misunderstanding, it is necessary to state that the above price is not claimed to represent a market value. It is a price worked out from week to week upon a system which has been used for many years as a basis for the fixing of certain contracts for crude tar of varying qualities in different areas.

The average prices of gas-works products during the week were: Pitch—East Coast, 29s. to 30s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 29s. to 30s.* Toluole, naked, North, 1s. 7½d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5d. Heavy naphtha, North, 1s. 2½d. to 1s. 3d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¾d. to 4⅞d.; low gravity, 4¼d. to 4½d. Carbolic acid, 60's, 1s. 7d. to 1s. 10d. Naphthalene, £13 10s. to £16. Salts, 70s. to 75s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal; "B" quality unsaleable. Heavy oil; Unfiltered anthracene oil, min. gr. 1,080, 4¾d. to 4⅞d.; filtered anthracene oil, min. gr. 1,080, 5¼d. to 5¾d.; heavy tar oil, gr. less than 1,080, 4¼d. to 4½d.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Scotland

GLASGOW, *Dec.* 17.

Market remains quiet and values show no material alteration during the week.

Crude gas-works tar.—Actual value is about 35s. to 36s. per ton *ex* works in bulk.

Pitch is now valued at about 21s. 6d. to 22s. 6d. per ton f.o.b. for export and round 20s. per ton *ex* works in bulk for home trade.

Refined tar.—Home market price is unchanged at 3¾d. to 4d. per gallon and export value is round 2¾d. to 3d. per gallon, both into buyers' packages at makers' works.

Creosote oil.—Plentiful supplies are available with values approximately as follows: Specification oil, 3¾d. to 4d. per gallon; low gravity, 4¼d. to 4½d. per gallon; neutral oil, 3¾d. to 4¼d. per gallon; all *ex* works in bulk.

Cresylic acid.—There is still a lack of buying interest and values are nominal as under: Pale, 97/99%, 1s. 2d. to 1s. 4d. per gallon; dark, 97/99%, 1s. to 1s. 2d. per gallon; and pale, 99/100%, 1s. 4d. to 1s. 8d. per gallon; all according to quality *ex* works in buyers' packages.

Crude naphtha.—The small quantities available readily command 5½d. to 6d. per gallon *ex* works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 3½d. to 1s. 4d. per gallon, and 90/190 heavy naphtha is round 1s. 1d. to 1s. 1½d. per gallon.

Motor benzole is 1s. 3d. to 1s. 4d. per gallon.

Pyridine.—90/160 grade is 8s. to 9s. per gallon, and 90/140 grade is 9s. to 10s. per gallon.

Benzole Prices

These are considered to be the market prices for benzole at the present time:

	s. d.	s. d.	
Crude benzole..	0 9½	to 0 10	per gall. at works
Motor „ ..	1 3	„ 1 3½	„ „ „
90% „ ..	1 4	„ 1 4½	„ „ „
Pure „ ..	1 8	„ 1 8½	„

Contracts Advertised To-Day

Carbonizing Plant.
Middlesbrough Gas Department. [p. 922.]

Condensers.
Middlesbrough Gas Department. [p. 922.]

Meters.
Dewsbury Gas Department. [p. 922.]

Reinforced Concrete Foundations.
Lincoln Gas Department. [p. 922.]

Diaries, Calendars, &c., Received

Seasonable gifts in the form of diaries, calendars, &c., have been received from the undermentioned friends, whose good wishes are cordially reciprocated:

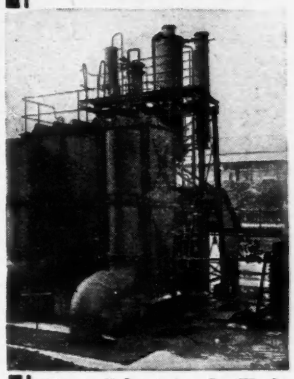
British Jeffrey-Diamond, Ltd., Wakefield.

Gas Meter Company, Ltd., Kingsland Road, E. 2.

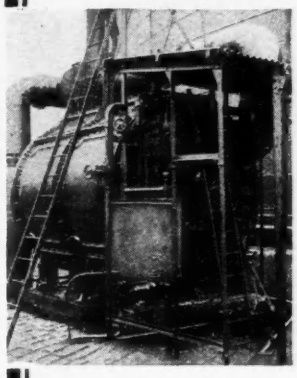
Newton Chambers & Co., Ltd., Thorncliffe, nr. Sheffield.

John G. Stein, Ltd., Bonnybridge.

These are "Permac" metal-to-metal Joints



"Permac" Joints in a Gas Works.



"Permac" Joints in a Gas Works.

Wouldn't it pay you to use it?

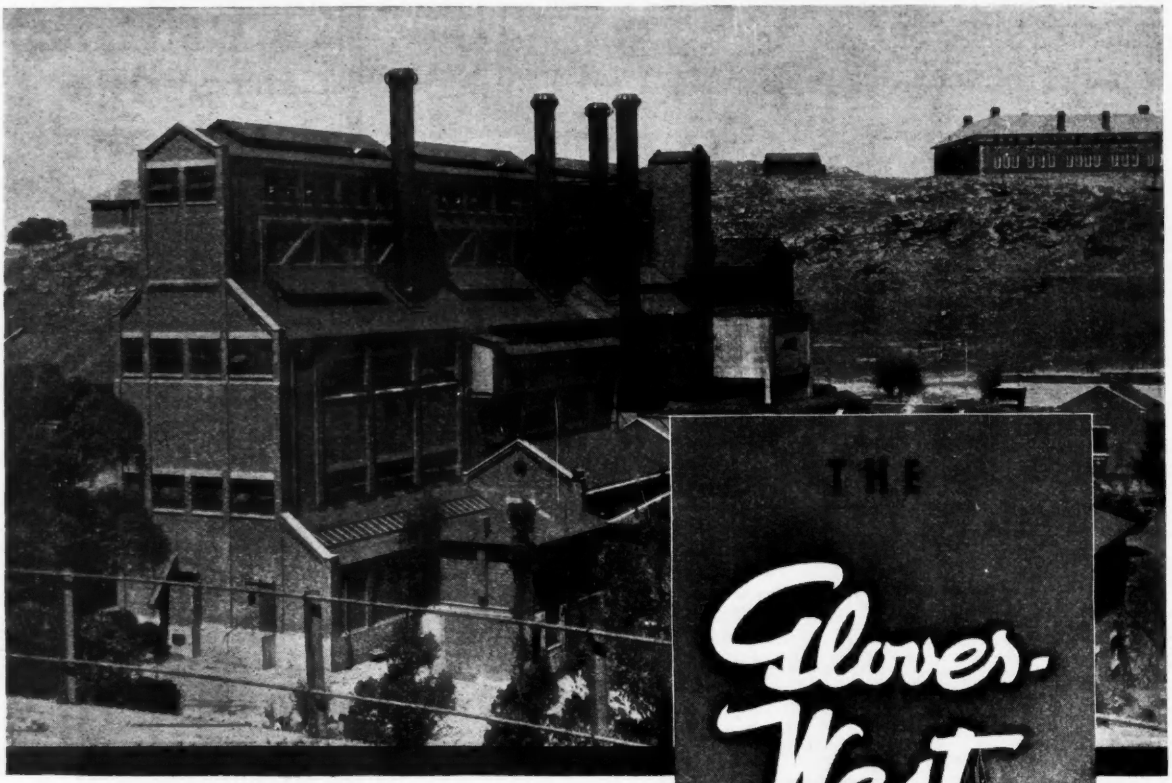
Ever since 1913 "PERMAC," the original Metal-to-Metal Jointing, has been holding up difficult joints like these in important Gas Works and on Coke Oven Plants all over the world. Equally suitable for any joint—steam, water, gas, oil—screw pipe or flange. Send for particulars.

Permac
METAL-TO-METAL JOINTING MATERIAL

Sole manufacturers:—

THOMAS & BISHOP LTD.
37, Tabernacle St.
LONDON, E.C. 2
Telephone: Clerkenwell 3351 (2 lines)

● CARBONIZATION IN VERTICAL RETORTS



The modern Glover-West vertical retort plant has behind it the accumulated experience of 64 years' constant research and development for the advancement of gas production methods the world over.

● *430 plants have been built or are on order for 230 Gas Undertakings in 24 countries.*

●

The picture shows the three installations of Glover-West vertical retorts at Johannesburg City Council's Cottesloe gasworks. The carbonising unit of the complete modern gasworks ordered for Johannesburg from this company in 1926 has been trebled to meet the rapid growth of demand. The latest extension put to work in 1937 is nearest the camera.

●

WEST'S GAS IMPROVEMENT CO. LTD.,

MANCHESTER: Albion Ironworks, Miles Platting ■ LONDON: Columbia House, Aldwych, W.C.2

GAS STOCKS AND SHARES

Business opened quietly on the Stock Exchange last week, but after the optimistic speeches of Sir John Simon and the Prime Minister with regard to trade prospects, markets became more active and the tone brighter. On Friday, however, the last day of the last Account of the year, the volume tailed off to very small proportions.

A satisfactory feature was the revival of interest in home rail preference and debenture stocks, many of which made good recoveries, and a better tendency was also noticeable among ordinaries. British Funds were steady, and in the Dominion group dealings began in the new Australian conversion loan which closed about 3 discount. Industrial prices on the whole were maintained and a few leaders made headway. Rubbers continued quiet on the small drop in the price of the commodity. Oil shares were weak on opening but rallied towards the close, while in the mining market the tone generally was easier.

The volume of business in the Gas Market was heavier than for some time past, a comparatively long list of transactions appearing each day last week. The demand, however, did not affect prices which with few exceptions remained unchanged. It will be seen in the Official List below that the rise of 1s. to 24s. 6d. in Colonial 8% preference was the only movement of note, and on the Provincial Exchanges, apart from a fractional drop in Liverpool ordinary, quotations were unaltered. Nominal prices in the Supplementary List were also maintained without change.

The next item of interest to holders of gas securities will be the final dividend announcements and publication of accounts. The Industry has been faced with several adverse factors during the year, notably two long periods of very unseasonable weather and extra costs for labour and raw material, which will doubtless in some cases affect profits, though it is to be hoped that any falling-off under this head will not be sufficient to justify any reduction in the final distribution.

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 16.	Rise or Fall on Week.
1,767,439	Sept. 5	8	8	Alliance & Dublin Ord. ...	130—140	...
374,000	June 20	4	4	Do. 4 p.c. Deb. ...	95—100	...
734,733	Nov. 7	5	5	Ascd. Gas & Water U'd'ts Ord.	17/—19/-	...
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/-	...
444,389	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	19/—21/-	...
296,523	,,	4	4	Do. 4 p.c. Irred. Cum. Pref.	16/—18/-	...
500,000	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb. ...	93—98	...
560,070	Aug. 22	7	7	Barnet Ord. 7 p.c.	157—162	...
300,000	Oct. 10	1/9[3]	1/4[1]	Bombay, Ltd.	24/—26/-	...
180,435	Aug. 22	9½	9½	Bournemouth sliding scale ...	195—205	...
640,407	,,	7	7	Do. 7 p.c. max. ...	157—162	...
495,960	,,	6	6	Do. 6 p.c. Pref. ...	130—135	...
50,000	June 20	3	3	Do. 3 p.c. Deb. ...	75—80	...
312,025	,,	4	4	Do. 4 p.c. Deb. ...	97—102	...
335,000	,,	5	5	Do. 5 p.c. Deb. ...	115—120	...
357,900	Aug. 8	7½	7½	Brighton, &c., 6 p.c. Con. ...	142—147	...
659,955	,,	6½	6½	Do. 5 p.c. Con. ...	126—131	...
205,500	,,	6	6	Do. 6 p.c. 'B' Pref.	125—130	...
855,000	Sept. 19	8	7	British Ord.	133—138	...
100,000	June 3	7	7	Do. 7 p.c. Pref.	140—145	...
350,000	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	112—117	+2
120,000	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...
450,000	,,	5	5	Do. 5 p.c. Red. Deb. ...	100—105	...
450,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...
100,000	22 May'33	6	4	Cape Town, Ltd.	1—2	...
100,000	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1—2	—1
150,000	June 20	4½	4½	Do. 4½ p.c. Deb. ...	60—70	...
626,860	July 18	6	6	Cardiff Con. Ord.	118—123	...
237,860	June 3	5	5	Do. 5 p.c. Red. Deb.	105—110	...
98,936	Sept. 19	2/—	2/—	Colombo Ord....	1⅞—1¾	...
24,510	,,	1/4½	1/4½	Do. 7 p.c. Pref.... ...	22/6—24/6	...
739,453	Oct. 10	—/11·48	—/11·48	Colonial Gas Assn. Ltd. Ord.	16/6—18/6	...
296,144	,,	1/3·30	1/3·30	Do. 8 p.c. Pref. ...	23/6—25/6	+1/-
1,775,005	Aug. 8	5	5	Commercial Ord.	78—83	...
140,000	,,	—	§13/4	Do. 4 p.c. Red. Pref.	95—100	...
620,000	Dec. 5	3	3	Do. 3 p.c. Deb. ...	71—76*	...
286,344	Aug. 22	5	5	Do. 5 p.c. Deb. ...	113—118	...
200,000	,,	—	§30/2	Do. 3½ p.c. Red. Deb.	97—102	...
807,560	Aug. 8	7	7	Croydon sliding scale ...	136—141	...
644,590	,,	5	5	Do. max. div. ...	100—105	...
620,385	June 20	5	5	Do. 5 p.c. Deb. ...	113—118	...
239,000	Aug. 8	5	5	East Hull Ord. 5 p.c.	95—100	...
186,155	Aug. 8	6	6	East Surrey Ord. 5 p.c. ...	116—121	...
176,211	Dec. 5	5	5	Do. 5 p.c. Deb. ...	112—117*	...
250,000	Nov. 7	8	4	Gas Consolidation Ord. 'B' ...	19/—21/-	...
250,000	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	17/6—19/6	...
9,223,324	Aug. 8	5[2]	5[2]	Gas Light & Coke Crd. ...	22/3—23/3[a]	...
2,600,000	,,	3½	3½	Do. 3½ p.c. max. ...	79—82	...
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref....	98—101	...
2,993,000	July 4	—	3½	Do. 3½ p.c. Red. Pref....	98—101	...
8,602,497	Nov. 21	3	3	Do. 3 p.c. Con. Deb....	78—81	...
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb....	109—113	...
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb....	107—111	...
700,000	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb....	93—98	...
270,466	Aug. 22	6	6	Harrogate New Cons. ...	117—122	...
157,500	Mar. 21	1/2[3]	‡1/-	Hong Kong and China Ord....	3—1	...
213,200	Aug. 8	6	5[1]	Hornsey Con. 3½ p.c ...	97—102	...
5,600,000	Oct. 24	12	8	Imperial Continental Cap ...	108—113	...
223,130	July 18	3½	3½	Do. 3½ p.c. Red. Deb....	87—92	...
235,242	Aug. 8	8½	8½	Lea Bridge 5 p.c. Ord. ...	162—167	...
63,480	June 20	3	3	Maidstone 3 p.c. Deb. ...	70—75	...
45,000	Nov. 21	†10	†10	Malta & Mediterranean ...	130—135	...
				Metropolitan (of Melbourne) 5½ p.c Red. Deb.	100—105	...
392,000	Oct. 3	5½	5½	M.S. Utility 'C' Cons. ...	99—104	...
231,977	Aug. 22	5	5	Do. 4 p.c. Cons. Pref.	95—100	...
968,658	,,	4	4			

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 16.	Rise or Fall on Week.
390,076	June 20	4	4	M.S. Utility 4 p.c. Deb. ...	95—100	...
148,955	,,	5	5	Do. 5 p.c. Deb. ...	113—118	...
125,000	July 1	3½	3½	Do. 3½ p.c. Red. Bds.	95—98	...
675,000	Nov 21	†6	†6	Montevideo, Ltd.	70—75	...
250,000	Aug. 8	7½	7½	North Middlesex 6 p.c. Con.	142—147	...
396,160	Aug. 8	5	5	Northampton 5 p.c. max. ...	105—110	...
300,000	Oct. 24	†7	†9	Oriental, Ltd.	145—150	...
468,537	Dec. 5	8	7[3]	Plymouth & Stonehouse 5 p.c.	135—145*	...
621,667	Aug. 8	8½	8½	Portsmouth & Gosport Cons.	157—162	...
241,446	,,	5	5	Do. 5 p.c. max. ...	100—105	...
73,350	,,	5	5	Do. 5 p.c. Pref. ...	107—112	...
75,000	,,	4	4	Do. 4 p.c. Pref. ...	90—95	...
114,000	Aug. 8	5	5	Preston 5 p.c. Pref.	105—110	...
247,966	June 3	4	4	Primitiva 4 p.c. Cons. Deb. ...	98—103	...
625,959	July 18	4	4	Do. 4 p.c. Red. Deb. ...	94—99	...
15,000	Sept. 5	6	6	San Paulo 6 p.c. Cum. Pref. ...	8½—9	...
441,275	Sept. 19	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	20/6—22/6	...
460,810	Sept. 19	—/10[3]	—/10[3]	,, ,, 4½ p.c. Cum. Pref.	19/6—21/6	...
133,201	Aug. 22	5	8½	Shrewsbury 5 p.c. Ord. ...	143—148	...
9,000	June 3	4	‡4	South African Ord.	4½—5½	...
1,371,752	Aug. 22	1/2[3]	1/2[3]	South East'n Gas Cn. Ld. Ord.	21/—23/-	...
871,636	,,	—/10[3]	—/10[3]	Do. 4½ p.c. Red. Cum. Pref.	19/—21/-	...
498,818	,,	4	4	Do. 4 p.c. Cum. Pref. ...	18/—20/-	...
450,000	Aug. 8	4	4	Do. 4 p.c. Deb.	99—102	...
150,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	94—97	...
6,709,895	Aug. 8	6	5	South Met. Ord.	103—106	...
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pref. ...	128—133	...
850,000	,,	4	4	Do. 4 p.c. Irred. Pref. ...	95—100	...
1,895,445	June 20	3	3	Do. 3 p.c. Deb.	75—80	...
1,000,000	July 4	5	5	Do. 5 p.c. Red. Deb. ...	107—112	...
600,000	,,	—	§31/-	Do. 3½ p.c. Red. Deb. ...	97—102	...
1,543,795	Aug. 8	6	6	South Suburban Ord. 5 p.c. ...	113—118	...
512,825	,,	5	5	Do. 5 p.c. Pref.... ...	108—113	...
500,000	,,	4	4	Do. 4 p.c. Pref.... ...	95—100	...
250,000	,,	3½	3½	Do. 3½ p.c. Red. Pref. ...	92—97	...
888,587	Dec. 5	5	5	Do. 5 p.c. Deb.... ...	113—118*	...
250,000	,,	4	4	Do. 4 p.c. Deb.... ...	95—100*	...
200,000	Aug. 8	3½	3½	Do. 3½ p.c. Red. Deb. ...	94—99	...
427,859	Sept. 19	8[3]	9[3]	S. Western Gas & Water Ord.	16/—18/-	...
160,523	Oct. 10	—/10[3]	—/10[3]	Do. 4½ p.c. Red. Cum. Pf.	19/—21/-	...
110,000	June 3	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...
750,541	Aug. 8	5½	5	Southampton Ord. 5 p.c. ...	105—110	...
148,836	June 3	4	4	Do. 4 p.c. Deb.	95—100	...
350,000	Aug. 8	5½	5½	Swansea 5½ p.c. Red. Pref. ...	105—110	...
200,000	June 3	3½	3½	Do. 3½ p.c. Red. Deb. ...	93—98	...
1,076,490	Aug. 8	6½	6½	Tottenham and District Ord.	125—130	...
409,835	,,	5½	5½	Do. 5½ p.c. Pref. ...	116—121	...
62,235	,,	5	5	Do. 5 p.c. Pref. ...	108—113	...
334,615	Dec. 5	4	4	Do. 4 p.c. Deb. ...	95—100*	...
85,701	Nov. 21	6	6	Tuscan 6 p.c. Red. Deb. ...	98—100	...
1,131,550	Aug. 22	6	4	U. Kingdom Gas Cor. Ord. ...	17/6—19/6	...
1,051,280	Nov. 7	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	19/—21/-	...
762,241	,,	4	4	Do. 4 p.c. 1st Red. Cum. Pf.	19/—21/-	...
745,263	June 3	4½	4½	Do. 4½ p.c. 2nd Non-Cum.Pf.	15/6—17/6	...
1,066,186	Sept. 5	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—98	...
375,689	Aug. 8	7	7	Uxbridge, &c., 5 p.c.	125—130	...
133,010	,,	5	5	Do. 5 p.c. Pref. ...	108—113	...
1,371,138	Aug. 8	7	7	Wandsworth Consolidated ...	135—140	...
2,525,768	,,	4	4	Do. 4 p.c. Pref. ...	95—100	...
1,348,964	June 3	5	5	Do. 5 p.c. Deb. ...	115—120	...
383,745	,,	4	4	Do. 4 p.c. Deb. ...	95—100	...
400,000	,,	—	§25/-	Do. 3½ p.c. Red Deb.	97—102	...
558,342	Aug.	7	6½	Watford and St. Albans Ord.	128—133	...
200,000	,,	5	5	Do. 5 p.c. Pref. ...	107—112	...
200,000	,,	5½	5½	Do. 5½ p.c. Pref. ...	113—118	...
200,000	,,	—	16/8§	Do. 4 p.c. Red. Pref.	95—100	...
200,000	June 3	4	4	Do. 4 p.c. Red. Deb.	96—101	...
200,000	,,	3½	3½	Do. 3½ p.c. Red. Deb.	92—97	...

a.—The quotation is per £1 of stock. * Ex. div. † Paid free of income-tax. ‡ For year. § Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Cont.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Nominal Quotations Dec. 16.	Rise or Fall on Week.
202,152	Sept. 5	5	5	Ascot Ord.	101—106	...
128,162	July 18	5	5	Do. 5 p.c. Pref.	108—113	...
31,035	Aug. 22	-/4⅞	-/4⅞	Associated Utilities 4 p.c. Pref.	16/-—18/-	...
100,000	Dec. 13	...	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...
17,000	Aug. 22	8	8	Bognor Orig Ord. 'A' ...	155—165	...
62,210	,,	8	8	Do. New Addl. 'A' ...	155—165	...
87,160	,,	7	7	Do. New 7 p.c. max. ...	145—155	...
37,440	Aug. 8	10	10	Cam. Univ. & Town 10 p.c. max.	155—158	...
125,970	,,	7	7	Do 7 p.c. max.	133—138	...
39,025	,,	5	5	Do. 5 p.c. max.	97—102	...
96,410	July 18	4½	4½	Cardiff 4½ p.c. Pref.	95—100	...
150,000	Aug. 8	4	4	Croydon 4 p.c. Pref.	97—100	...
130,000	June 20	4	4	Do. 4 p.c. Deb.	95—100	...
65,000	Aug. 8	8½	7½	Eastbourne 'A' 5 p.c. ...	140—145	...
198,000	,,	7	6	Do. 'B' 3½ p.c.	114—119	...
112,312	,,	5	5	Do. 5 p.c. Pref.	107—112	...
130,000	June 20	5	5	Do. 5 p.c. Deb.	112—117	...
24,000	Aug. 8	8½	8½	Great Yarmouth 8½ p.c. max.	43—48	...
59,400	,,	7½	7½	Do. 7½ p.c. max.	33—38	...
51,160	Dec. 5	5½	5½	Do. 5½ p.c. Deb.	120—125*	...
152,000	Sept. 5	9	8	Guildford Cons.	163—168	...
54,055	,,	5	5	Do. 5 p.c. Pref.	107—112	...
68,250	June 3	5	5	Do. 5 p.c. Deb.	107—112	...
156,000	Aug. 22	7½	7½	Hampton Court Cons. ...	131—136	...
80,000	Aug. 8	4	4	Lea Bridge 4 p.c. Pref. ...	90—95	...
40,000	,,	6	6	Do. 6 p.c. Pref.	121—126	...
94,876	Dec. 5	4	4	Do. 4 p.c. Deb.	94—99*	...
73,620	Sept. 5	8½	8½	Luton Cons. 'A'	153—163	...
107,960	Sept. 19	5½	4	Mid Kent Ord.	8½—9½	...
230,940	Aug. 8	10	10	Oxford & District Ord. ...	195—200	...
47,112	,,	5	5	Do. 5 p.c. Pref.	106—111	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	107—112	...
126,193	Nov. 7	7½	7½	Peterborough Ord.	137—142	...
64,990	Sept. 5	6½	7½	Redditch Ord....	118—128	...
166,850	Aug. 8	8	8	Romford Ord....	142—147	...
60,000	,,	4	4	Do. 4 p.c. Pref.	99—103	...
44,000	Sept. 19	5	5	Do 5 p.c. Deb.	112—117	...
25,570	Aug. 8	5½	5½	Rugby 5½ p.c. Pref.	120—125	...
25,000	,,	6	6	Do 6 p.c. Red. Pref. ...	104—109	...
42,750	Dec. 5	5½	5½	Do 5½ p.c. Deb.	117—122*	...
110,950	Aug. 22	8	8	Ryde Ord.	140—150	...
270,086	Sept. 5	7	7	Slough Ord.	128—133	...
21,000	June 20	5	5	Do. 5 p.c. Deb.	110—115	...
28,872	Nov. 7	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/-	...
28 866	Sept. 5	4½	4½	Do. 4½ p c Red. Cum. Pref.	18/—20/-	...
117 228	Aug. 8	7	5	Swindon Cons.	102—107	...
60 425	Dec. 5	5	5	Do. 5 p.c. Deb.	110—115*	...
64,380	June 3	5	5	Torquay & Paignton 5 p.c. Pref.	107—112	...
130,000	Aug. 8	8	5	Wakefield Ord.	116—121	...
81,650	,,	5	5	Do. 5 p.c. max.	100—105	...
82,000	Aug. 8	6	6	Weymouth Ord.	103—108	...
98,384	Aug 22	6	6	Wolverhampton 6 p.c. Pref.	118—123	...
160,000	June 20	5½	5½	Do. 5½ p.c.Rd.Db.	105—110	...
90,000	June 20	5	5	York 5 p.c. Red. Deb. ...	104—109	...
133,640	July 18	6½	6½	Yorktown (Cam.) 5 p.c. Cons.	118—123	...
120,000	,,	5	5	Do. 5 p.c. Pref.	105—110	...
35,000	Dec. 5	5½	5½	Do. 5½ p.c. Deb.	120—125*	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 16.	Rise or Fall on Week.
347,756	July 18	6	5	Bath Cons.	117—119	...
1,667,250	July 18	5	5	Bristol, 5 p.c. max.	111—113	...
120,420	June 3	4	4	Do. 1st 4 p.c. Deb. ...	100—102	...
217,670	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100—102	...
328,790	,,	5	5	Do. 5 p.c. Deb.	119—122	...
274,000	Aug. 8	5	5	Newport (Mon). 5 p.c. max....	97—99	...
13,200	Sept. 19	8⅔	7	Pontyp'l Gas & W. 10 p.c. 'A'	12⅝—13⅜	...
13,600	,,	6	5	Do. 7 p.c. 'B'	11⅛—12⅛	...
40,000	,,	6	5	Do. 7 p.c. 'C'	11⅛—12⅛	...
140,778	Aug. 8	5	5	Weston-super-Mare Cons. ...	106—108	...
64,338	June 20	4	4	Do. 4 p.c. Deb.	100—102	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	151—154	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 16.	Rise or Fall on Week.
157,150	Aug. 8	6½	5	Chester 5 p.c. Ord.	109—111	...
92,500	June 20	4	4	Do. 4 p.c. Pref.	95—99	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	87—90	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—101	...
2,167,410	Aug. 22	6	6	Liverpool 5 p.c. Ord.... ...	122—124	—½
245,500	June 20	5	5	Do. 5 p.c. Red. Pref. ...	100—105	...
306,083	July 18	4	4	Do. 4 p.c. Deb....	100—102	...
106,280	Aug. 8	10	10	Preston 'A' 10 p.c.	198—208	...
188,219	,,	7	7	Do. 'B' 7 p.c.	131—141	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 16.	Rise or Fall on Week.
122,577	Aug. 8	8	8	Blyth 5 p.c. Ord.	160—162	...
732,000	Aug. 22	5	5	Hartlepool G. & W. Cn. & New	89½—90½	...
2,061,315	Aug. 8	5½	5	Newcastle & Gateshead Con.	22/6—23/-a	...
682,856	,,	4	4	Do. 4 p.c. Pref. ...	99½—100⅛	...
776,706	June 20	3½	3½	Do. 3½ p.c. Deb. ...	89 —90	...
277,285	Oct. 24	5	5	Do. 5 p.c. Deb. '43 ...	103½—105½	...
332,351	Aug. 22	6	6	Sunderland 6 p.c. max. ...	135—137	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 16.	Rise or Fall on Week.
542,270	Aug. 8	9	6	Derby Con.	133—138	...
55,000	June 3	4	4	Do. 4 p.c. Deb.	100—105	...
20,000	June 20	5	5	Long Eaton 5 p.c. Pref. ...	10—12	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...

SHEFFIELD EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Dec. 16.	Rise or Fall on Week.
10,000	Aug. 8	10	10	Great Grimsby 'A' Ord. ...	205—215	...
6,500	,,	10	10	Do. 'B' Ord. ...	205—215	...
79,000	,,	10	10	Do. 'C' Ord. ...	195—205	...
1,806,339	Aug. 22	6½	6½	Sheffield Cons.	140—142	...
95,000	July 4	4	4	Do. 4 p.c. Deb.	101—103	...

a The quotation is per £1 of Stock. * Ex div.

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